A SKETCH

OF

MEDICAL CLIMATOLOGY:

PAU AND ITS NEIGHBOURHOOD,

BY

H. DUBOUÉ (OF PAU) M. D. PARIS

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BY

H. DUBOUÉ (of PAU) M. D. PARIS
Corresponding member of the Academy of Medicine of Paris

A paper read before the Medical Association of the Basses-Pyrénées.
Group of Pau

TRANSLATED FROM THE FRENCH
BY
R. de MUSGRAVE CLAY (of PAU) M. D. PARIS

PAU
IMPRIMERIE VERONESE, RUE PRÉFECTURE, 11
1882

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The following letter is the best Preface to this translation of Dr Duboué's work :

My dear « *Confrère* »,

You have lived so long at Pau that you are more competent than anybody else to appreciate the prominent features of our climate, and the fact of your being both a medical man and a foreigner has enabled you to investigate with impartiality the effects it really produces on healthy or diseased organisms.

When you kindly offered to translate my work on our climate, you also kindly informed me that you were quite prepared to indorse the *ensemble* of my medical views on the subject, and that, moreover, you only undertook the task because the reserve and accuracy of my judgments and observations had struck you. You were desirous also to give our foreign « *confrères* » the complementary information they lacked concerning the climate of Pau, as the work of our lamented « *confrère* », the late Sir Alexander Taylor, excellent in other respects, was chiefly intended for lay readers, but not written exclusively in a medical point of view.

I have therefore to thank you, my dear « *confrère* », for the step you have graciously taken, and I heartily hope that my foreign « *confrères* », after carefully weighing my arguments, will fully agree with you.

If I am fortunate enough to obtain this result, a large share of it will belong to you; for I have most thoroughly and carefully read your translation and find that it renders my meaning most accurately ; it will undoubtedly make known to the profession at large, certain experimental data that careful and protracted observations have taught me, and which will not,, I hope, be considered as entirely devoid of interest by those who are obliged to seek relief out of their own country.

Believe me, my dear « *confrère* », etc.

H. DUBOUÉ

Pau, December 26th 1881

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Without assuming to be a learned Society, each local medical Association, in collecting and grouping together the various hygienic and pathological studies that have been made in its own region, each local medical association might, if it chose, contribute largely to establish, ere long, a complete pathological study of France, of which we only now possess disseminated and insufficient fragments. Although such documents would require lengthened and close observations, together with the assistance of a great number of medical men, it may not be out of place here, nor should we hesitate, to give an outline of some of its most important features, even tho' unable to give them with all the various details that the future alone will reveal to us.

My intention therefore, in this short essay, is to condense, as it were, the general impressions left on my mind by the characteristic features of the various morbid affections I have been called upon to attend, during a practice of upwards of twenty years, in this district.

Far from passing in review the whole study of nosology, I intend to restrict myself briefly to the observations I have

made in cases that have struck me the most forcibly. If I do not succeed in being perfectly exact in my appreciations, I can at least affirm that I give them to my « *confrères* » in the greatest sincerity, scrupulously avoiding all judgments more likely to lead to controversy, particularly those on therapeutics, for example, on which a uniformity of opinion is as desirable as it is difficult to obtain.

However incomplete these summary appreciations may be, I cannot but hope they will prove of some use. For it is by comparison that we judge all things; and, to obtain a correct opinion in the most ordinary practical case, we invariably appeal to the experience of the past, and, if possible, to the experience acquired in the centre of our practice. Would a foreign physician, for example, whose observations on *scarlet fever* and *hooping cough* have been acquired in London, be justified in forming the same serious prognosis in our region as he probably would in that large city? In the last week of March, this year (1880), in London, 51 deaths from scarlet fever and 112 from hooping cough were registered, whereas I am convinced that we should be obliged to go back several centuries, to find such a mortality, proceeding from the same affections, in the whole of our medical region.

Who can fail to see by this, the great necessity that exists to establish, by repeated statistics and precise figures, the number and the degree of gravity of the different morbid affections observable in our region, etc.; statistics that none of us possessed in the beginning of our practice, and that, if left to ourselves, we can only acquire insufficiently, even at the close of a long and laborious career? Such a study, if well understood and well carried out, with as much precision as regularity, would honour the medical men of the region, and be more particularly worthy of the attention of the

younger members of the profession. The latter would certainly find among their elders all the information they might require during the course of their investigations; by this means, they would soon establish the solid foundation of our regional climatology, and, after having worked usefully for themselves, they would extend to others the benefit of their knowledge, acquiring thereby a claim to their gratitude.

On the other hand, if these documents, when compiled, were submitted, be it only once a year, to the control of the associated physicians of our group, they would acquire much more weight, after the conscientious discussion they would give rise to. We should then see the medical men of the same regional association agree in the view they take of the same morbid affections they are called upon to attend daily; and, sooner or later, the concurrence of opinions would lead to uniformity of medical practice, and to the adoption of the best therapeutical methods.

In the meanwhile, as such a desirable object cannot be obtained for years, I will only mention the remarks I have been able to make in the course of my own practice up to the present date.

Before doing so, however, it is indispensable to give some topographical details of our town, as well as the principal meteorological phenomena we habitually observe. I should add that, having made no such investigations myself, I have merely acquired my knowledge from the works that have been published on the climate of Pau by writers who have obtained great and legitimate authority on the subject.

A. Topography and Meteorology

The town of Pau, situated 43°17' of latitude and 2°42' of west longitude stands at 207 metres above the level of the

sea, at the further end of a ridge or « plateau », which is itself 35 or 40 metres higher than the valley of the Gave, a river that flows just below. It is intersected almost in its entire length from east to west by a deep ravine, in the bed of which runs a small rivulet, now entirely covered in, and called the Hédas. The northern, eastern and southern boundaries are represented by hills which surround and protect the town almost completely against the wind. The western side, the only one which might be affected by the wind, happens to be screened to the extent of more than a kilometer, by a promenade called the « *Parc* », with very lofty trees growing very close together; this « Parc » extends in the same general direction as the town, up to the western end of the « plateau » on which the latter stands. In fact, art has come to the aid of nature to shelter as much as possible our city from moderate winds, if not from strong winds, which very unfrequently blow.

Such a situation, aided by the porous nature of its sandy soil (1) accounts for the fact that the rain water cannot possibly remain on the ground for any length of time; for, as it falls, it is partly absorbed by the soil, through which it percolates towards an underground thin layer of water, while the non absorbed remainder runs down the double slope I have just mentioned. In order to do away with even the slightest uncertainty in the reader's mind on this very important question, I beg to quote *in extenso* a very precise and highly commendable paper of notes, which has been kindly tendered to me by my excellent friend, Mr Genreau, mining engineer, and for many years a resident of Pau. It runs thus : « The greater part of the town of Pau is situated

(1) Cf. Taylor : A comparative enquiry as to the preventive and curative influence of the climate of Pau and of Montpellier, Hyères, Nice, etc. — 3rd Ed. London. J. Churchill, 1866, p. 62.

« on a basis of ancient alluvions, which rises 30 or 35 « metres above the valley of the Ousse and the Gave « d'Ossau. This terrace is the continuation of the vast « « plateau » of the Pont-Long, which ascends gently, but « perceptibly to the foot of the hills of Buros and Morlaas, « with a slight declivity towards the south ; and being deeply « intersected in the very centre of Pau, by the little ravine « of the Hédas, and northwards by the depression of ground « which leads to the ravine of La Herrère, it is obvious, « from the configuration of the ground that the superficial « waters will flow away with the greatest rapidity, from « East to West, by following the direction of these two « cuttings, and southwards into the valley of the Ousse and « the Gave.

« Added to these favourable circumstances which are « due to the configuration of the ground, another feature, « viz : the composition of the sub-soil, prevents the stagna- « tion of the waters.

« This composition will be distinctly appreciated by those « who walk down to the valley of the Ousse and the Gave « by the lanes that lead to the fountains of Trespoey and « Batsalle ; they will then observe that, below the superfi- « cial deposit of clay, the depth of which decreases on « the slopes, lies a considerable horizontal pebbly and « sandy deposit, consisting chiefly of ovoid pebbles, or « « *galets* » of granite and gneiss, the feldspathic elements « of which are entirely decomposed. These pebbles have « preserved their shape, but are easily dissociated ; they « are enrobed in fine sand, entirely devoid of any power « of adherence, so that the whole of the deposit is perfectly « permeable.

« The underground layer of water of the Pont-Long cir- « culates at the basis of this deposit, and there also spring

« up, in the ravine of La Herrère and in the valley of the « Ousse and the Gave, the marlpit fountains of Trespoey and « Batsalle.

« Below these diluvian deposits, at the foot of the terrace « on which the town stands, extend the last elevations « of Palassou's « *poudingue*, » a powerful agglomeration of « calcareous pebbles, which forms in this case a compact « and firmly cemented mass, that establishes a foundation « for the « Parc » of Pau and for the hills of Guindalos and « Jurançon.

« The depth of the superficial layer of clay which covers « the subjacent pebbly and sandy deposit, and thus forms « the soil of Pau, varies according to the different sections « of the town; but it never reaches beyond two metres, « even on the summits of the terrace, and it decreases con- « siderably on the slopes, being sometimes reduced to next « to nothing.

« This layer of clay is, in consequence of its very nature, « hardly permeable; but it has often disappeared in the « inhabitated parts, on account of the displacement of the « soil, and it is everywhere cut up by the foundations of the « numerous buildings of the town; consequently the subja- « cent permeable layer has been reached in a great many « places, and it is no longer isolated from the surface by « the interposition of an uninterrupted and impervious « coating of clay. The rain that falls can therefore easily « percolate the soil in a vertical direction, and the greater « part of it is absorbed by the pebbly and sandy deposit « which lies horizontally at little depth below the surface; « in fact, owing to the composition of the soil as well as to « the general configuration of the ground, every part of « the town gets easily and quickly dried. »

Thus once acquainted with the formation of the ground

and the soil, we can easily account for the fact that scarcely a few hours after the rain has ceased, and, *a fortiori*, the next day, the streets are almost quite dry. From the fact that rain cannot sojourn on the ground, the air of course can only seldom become saturated with moisture, even when the rain falls heavily and consecutively. The consequence is that, in Pau, the pavement of the streets, the bannisters of staircases, and the paper-hangings in houses rarely get moist. Other illustrations show that the air is really free from any damp : for instance, iron or steel articles of furniture, even when freely exposed to the air, hardly ever become oxydated ; and again, the rubbing of a match will, in any season,

MONTHS.	9 o'cl. A M	2 o'cl. P M
January	81	68
February	79	65
March	76	63
April	73	60
May	71	59
June	71	56
July	72	55
August	71	57
September	74	58
October	78	65
November	81	69
December	82	71
YEARLY AVERAGE	76	62

ignite the phosphorus, a fact of rather unfrequent occurrence in damp countries.

This absence of moisture has been already mentioned by Sir Alexander Taylor (1). On the other hand, the preceding table shows the average figures furnished by the hygrometer during the lapse of fifteen years; for this piece of information we are indebted to Dr Drewry Ottley (2).

And yet, the number of rainy days is considerable, for it is no less than 163 per year, or 13.5 per month, according to the same author, who has also supplied us with documents on the monthly average of the depth of rain-fall during a period of fifteen years (from 1854 to 1869).

January.	February.	March.	April.	May.	June.	
103.7	67.4	122.5	116.1	157.4	114.8	For the whole year 1186.0.
July.	August.	September.	October.	November.	December.	
52.8	56.8	91.7	113.0	95.6	94.1	

Again, the following is the average of barometrical pressure, compiled by the same author during the same period;

MONTHLY AVERAGE

January.	February.	March.	April.	May.	June.	July.	August.
—	—	—	—	—	—	—	—
743.7	744.0	742.0	742.2	741.7	743.5	743.7	743.0

September.	October.	November	December.
—	—	—	—
743.0	742.0	742.5	744.7.

MONTHLY VARIATION.

January.	February,	March.	April.	May.	June.	July.	August.
—	—	—	—	—	—	—	—
25.3	22.5	25.0	19.0	16.0	13.4	10 5	12.5

(1) Loc. cit. p. 60.
(2) Bullet. de la Société Ramond, 1872, p. 126 et seq.

September.	October.	November.	December.
—	—	—	—
15.6	19.5	23.8	21.4

VARIATION FROM ONE DAY TO THE OTHER.

January.	February.	March.	April.	May.	June.	July.	August.
—	—	—	—	—	—	—	—
3.6	3.4	3.7	3.2	2.4	2.4	1.8	2.0

September.	October.	November.	December.
—	—	—	—
2.7	2.9	3.2	3.3

Finally, the following is a temperature table kept by the same author during the same period of fifteen years.

MONTHS.	Average of the minima.	Average of the maxima.	Average at 9 o'cl AM	Monthly average	Absolute minima.	Absolute maxima.
January.....	2°,3	9°,1	4°,5	5°,70	— 12°,8	19°,0
February....	3.2	10.6	5.7	6.90	— 7.7	20.0
March.....	5.2	12.7	8.6	8.95	— 5.2	25.0
April.....	8.5	17.5	13.2	13.0	— 1.0	27.5
May.....	11.0	19.5	16.0	15.25	2.1	31.5
June.....	13.8	22.8	18 8	18.30	5.8	33.5
July.....	15.2	24.7	20.3	19.95	?	?
August.....	15.5	25 6	20.2	20.55	?	36.0
September...	13.2	23.5	17.9	18.35	5.0	32.0
October.....	10.0	18.2	13.5	14.10	— 0.1	26.5
November....	5.2	12.4	7.7	8 80	— 5.0	22.2
December....	3.2	9.5	5 0	6.35	— 6.6	16.0
Yearly average.	8.86	17 17	12.62	13.02		

The habitual absence of wind is one of the most remarkable features of our climate, and it has been noticed by all observers, whether professional or not, who have resided at Pau for any length of time. As I do not and cannot feel myself competent on meteorological questions, and would not like the reader to suppose that there is any partiality in my report of the opinions which have been published on the subject, I will quote *verbatim* a long extract from a valuable and conscientious work published on the climate of Pau by Mr Ed. Carrière, a physician who is a stranger to our town. It runs thus : (1) « As the most prominent of me-
« dical men who have written on the climate of Pau, I am
« bound to name Sir James Clark, the patriarch of medical
« climatology in England. The minute details into which he
« enters, in his work on this winter station, show that he
« never mentions impressions or observations without
« having controlled them himself; every page of his book
« on the contrary, proves that he has personally and care-
« fully studied the wintering station he so frequently recom-
« mends to his patients ; full justice is paid to the prevalent
« advantage of the climate, justified as it is, both by perso-
« nal impressions and by careful meteorological obser-
« vations.

« This prominent physician writes : [There are several
« circumstances in the climate of Pau which render it a
« favourable residence for a certain classs of invalids. The
« atmosphere, when it does not rain, is dry, and the
« weather fine, and there are neither fogs nor piercing
« winds....,. Calmness is a striking characteristic of the
« climate, high winds being of rare occurrence and short
« duration »].

(1) E. Carrière : Le climat de Pau, Paris, J. B. Baillièrs 1870 p. 53.

« Another scientific man, of no less authority, adds M. « Carrière, but this time a Frenchman, Dr P. C. A. Louis, « asserts the same facts in a still more explicit manner. « Clark is as affirmative as anybody can be. Dr Louis, « while relating his impressions, sets forth even more « forcibly the same advantage of the climate, a most « valuable one in a great many serious cases, and one « that is not easily met with, even in the most renowned « winter-stations. »

« This celebrated practitioner writes : [After the magni- « ficence of the landscape, one is, above all, struck, on « arriving at Pau, with the calm of the atmosphere, — a « calm so complete from the the 25th December of the last « year (1853) that I have indeed seen, during that space « of time, the leaves of the trees oscillate, but never their « branches; so much so that during the first six weeks of « my sojourn in the capital of Bearn, I lived in perpetual « astonishment, having never either seen or read of anything « similar..... If, since the middle of december, the atmos- « phere of Pau has not been so perfectly calm, wind has « always been rare ; and if I cannot affirm from my own « personal experience that it has always been so during « the worst season of the year, it is impossible for me to « believe, after having consulted the meteorological tables « kept at Pau, and collected the evidence of persons most « worthy of confidence, that the winter which is gone « differed much from those which preceded it »].

« Dr Foville, quoted by Scoresby, (*again adds M. Carrière*), « confirms by his own experience, after wintering two « years at Pau, the exactitude of the predominant meteo- « rological feature which had struck Dr Louis. The per- « fect stillness of the atmosphere, according to him, forces « itself upon the observer more prominently than anything « else ».

Further on, M. Carrière quotes the opinions of Sir Alexander Taylor, and of Drs Scoresby and Gigot-Suard:

« Dr A. Taylor (1), he writes, sums up in the following « terms the chief qualities of the atmosphere, thereby giving « them additional weight :

[« From the topographic features of the country surrounding Pau, it is almost completely shielded from wind ; so « much so, that during successive days, it is difficult to indicate the point from which the wind blows..... Although « there are considerable atmospheric variations at Pau, still, « from the great absence of wind, these variations pass by « comparison harmlessy over the invalid]. In fact, the human machinery, whether in health or in disease, seems « to partake of the stillness which reigns over the world.

« Next to Taylor, we may quote Scoresby, one of his « cuntrymen... »

« Dr Gigot-Suard, inhis works on different climates, gives « a good explanation of the meteorological condition of « Pau. He not only cites the most valuable testimonies on « the subject, but he also criticises them in a judicious « manner. Like his predecessors, he brings to light the characteristic feature which imparts a special physiognomy « to the climate, viz. the perfect stillness of the atmosphere.

« [The temperature, says he, is also subject to frequent « and considerable variations; but, in consequence of its « topographical position, the town is almost entirely sheltered from the wind, and, in the absence of any powerful « agitation of the air, the perturbations of the atmospheric « caloricity are less severely felt by delicate and sensitive « patients.] »

(1) Taylor. Op. cit.

As to the direction and influence of the prevalent winds, the following is the opinion of sir James Clark, quoted by sir Alexander Taylor (1) :

« The west blowing directly from the Atlantic is accom-
« panied with rain ; the wind from the north-west and from
« this point to the north-east brings dry cold weather. The
« south and south-west winds are warm and oppressive.
« The westerly or Atlantic winds are the most prevalent;
« the north wind blows feebly and is not frequent ; the op-
« pressive southerly winds are of rare occurrence, and
« seldom continue longer then twenty-four hours. Indeed
« Pau appears almost exempt from the oppressive southerly
« winds on the one hand, and the cold north-west winds
« on the other, both of which prevail over this part of
« France generally.

« The easterly winds are next in frequency to the west,
« with which they usually alternate ; and it is observed
« that according as the one or other wind prevails, the
« weather is rainy, or dry and pleasant ».

I am indebted to the obliging courtesy of my friend Mr Albert Piche, (whose competence in such matters is highly appreciated) for being able to add to the above mentioned information some valuable, and hitherto unpublished documents, on various meteorological phenomena observed either in Pau or in the neighbourhood. I am therefore bound to publish in the original text the notes Mr Piche has kindly written at my request, as well as the accompanying tables.

(1) Taylor, A comparative enquiry, etc. A new edition, London, J. W. Parker and Son. 1856, p. 75,

Notes on a double series of unpublished observations concerning the climate of Pau, by M. A. Piche.

Secretary to the Meteorological committee of the Basses-Pyrénées.

I. Observations collected by Dr Ottley.

In his work on the climate of Pau Dr Carrière twice mentions Dr Ottley's name; but he does not seem to have had before him the observations made by this English physician. And yet, Dr Ottley is the only person by whom a long series of meteorological observations, made on the spot and in tolerably good conditions, has ever been successfully conducted.

In 1872, he wrote in the « Bulletin de la Société Ramond » published at Bagnères-de-Bigorre, an essay with the following title: « Notes on the meteorology of Pau, » in which he summed up his observations during fifteen years (1854-1868) and to which he added several tables.

It is very desirable that this essay should be reprinted; for, at present, it is difficult to procure.

In the mean time, I am glad to hear that my colleague and friend Dr Duboué wishes to insert in his essay another series of observations made by Dr Ottley, and hitherto unpublished.

This manuscript, given to me by Dr Daran, comprises

only the observations of ten years (1854-1863); but it not only gives the general averages of that period, but contains also the monthly averages year by year, and thereby enables the reader to become acquainted with the variations of the climate from one year to the other, an information much more important than the mere general average.

I have reproduced the tables very carefully and re-calculated the averages, some of which contained slight errors.

Such a document is very valuable for the study of the climate of Pau.

Although these observations are not derived from strictly scientific methods, I think they possess considerable value and they must be very nearly correct.

The pluviometrical observations alone may give rise to slight inaccuracies; by comparing them with other observations, I have found the figures rather exaggerated; besides, I once happened to see in the hands of Mr Anderson the pluviometer used by Dr Ottley, and I ascertained that the cover did not shut close, and let in a little water.

Full confidence cannot therefore be placed in these observations concerning the depth of rainfall.

Dr Ottley's calculations of the monthly average are supplied by the average of the minima, that of the maxima and that of 9 o'cl. AM, and rectified by the necessary corrections in order to obtain the true average, according to the meteorological tables of the Greenwich Observatory.

Whether these tables may or may not be applied to Pau, I can hardly say; and therefore I have given in the ninth column the averages such as I have obtained them from the minima and maxima only.

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	5.9	8	69.4	2°,8	5°,8	10°,6	6°,7	6°,70	— 2°8	16°,0	2	84
1855	4.9	7	23.9	— 0.9	1 8	5.9	2.4	2.50	— 12.8	16.1	20	82
1856	8.1	21	112.1	4.4	6.7	10 7	7.4	7.55	— 1.6	16.0	2	82
1857	7.5	21	160.7	1.7	3.2	6.6	3.9	4.15	— 4.9	14.8	9	90
1858	3.5	1	2.0	— 1.8	— 0.4	6 0	1.4	2.10	— 6.8	11.3	26	79
1859	5.3	12	61.2	0.8	2 7	7.9	4.0	4.35	— 4.5	14.2	15	83
1860	6.9	19	163.2	5.1	7.4	11.0	8.0	8.05	— 0.3	17.7	0	79
1861	3.5	6	33.3	1.1	3.5	8 7	4.6	4.90	— 4.8	17.8	12	78
1862	5.5	16	86.3	2.7	5.0	10.7	6.0	6.70	— 4.8	18 4	4.	84
1863	5.0	15	90.9	1.9	4.7	10.6	5.5	6.25	— 2.7	18.4	8	82
Minima....	3.5	1	2.0	— 1.8	— 0.4	5.9	1.4	2.10	— 12.8	11.3	0	78
Maxima....	8.1	21	163.2	5.1	7.4	11.0	8.0	8.05	— 0.3	18.4	26	90
Av. of 10 years	5.61	12 6	80.30	1.78	4.13	8.87	4.99	5.325	— 4.60	16.07	9.8	82.3

Column 2. — The nebulosity is measured from 0 (blue sky) to 10 (cloudy sky),
Column 3. — Days on which the pluviometer gave a measurable quantity of water are alone registered as rainy days.
Column 4. — The pluviometer was 50 feet above the level of the ground and could not be influenced by the neighbouring roofs.
Column 8. — The monthly average of the temperature is calculated from columns 5, 6 and 7, and the proper corrections have been made to obtain the true average from the meteorological tables of the Greenwich Observatory.
Column 12. — The hygrometric degree is supplied by psychrometric observations: 100 represents the saturation of the air.

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	5.2	10	44.3	2°,0	4°,6	8°,0	4°,8	5°,00	— 8°,2	13°,5	4	87
1855	6.4	16	112.7	5.1	7.6	11.8	8.3	8.45	— 2.6	17.0	1	84
1856	4.4	9	76 6	3.3	5.7	12.5	7.8	7.90	— 2.8	20.1	8	79
1857	4.6	4	36.1	1.9	4.6	10.5	5.6	6.20	— 5.6	16.7	5	81
1858	5.4	6	31.2	3.7	6.2	12.8	7.6	8.25	— 0.9	17.2	3	82
1859	4.6	14	98.6	3.2	6 4	10.8	6.7	7.00	— 0.6	15.0	2	80
1860	5.9	11	53.9	0.0	1.9	5.3	2.4	2.65	— 9.1	14.6	14	75
1861	6.2	10	68.3	3.8	7.0	11.2	7.3	7.50	0.0	18.4	1	78
1862	2.8	7	31.5	2.3	5.4	12.0	6.9	7.15	— 7.2	20.1	8	75
1863	1.7	3	5.5	2.4	4.2	11.3	6.0	6.85	— 0.7	13.3	7	80
Minima....	1.7	3	5.5	0.0	1.9	5.3	2.4	2.65	0.0	13.3	1	75
Maxima....	6.4	16	112.7	5.1	7.6	12.8	8.3	8.45	— 9 1	20.1	14	87
Av. of 10 years	4.72	9.0	55.47	2.77	5.36	10.62	6.34	6.695	— 3.77	16.59	5.3	80.1

Column 9. — On the manuscript the figures of the decimal fractions of degrees are hardly legible.

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	4.9	4	22.0	4°,6	9°,4	14°,0	9°,0	9°,30	0°,8	19°,2	0	81
1855	7.0	17	228.5	4.4	8.2	12 3	8.0	8.35	— 2.9	23.3	2	85
1856	7.2	8	53.9	6.4	10.0	14.8	10.0	10.60	0.2	20.0	0	78
1857	6.5	10	152 3	5.5	8.7	13.5	8.8	9 50	— 1.7	21.3	2	83
1858	6.2	14	121.4	5.9	8.5	13.5	9.0	9.70	— 2.4	21.0	2	78
1859	4.1	12	82.9	5.3	8.6	15.0	9.5	10 15	1.4	21.2	0	75
1860	6.5	14	31.4	4.0	7.6	10.6	7.1	7.30	— 4.7	16.4	4	77
1861	6.1	20	110.3	5.8	9.9	12.9	9.2	9.35	0.6	18.0	0	78
1862	6.5	16	166.1	7.2	11.2	16.0	11.1	11.60	3.3	25 0	0	73
1863	6.3	16	175.8	5.0	8.2	12.0	8.0	8.50	2.2	17.8	0	82
Minima....	4.1	4	22.0	4.0	8.2	10.6	8.0	7.30	— 4.7	16.4	0	73
Maxima....	7.2	20	228.5	7.2	11.2	16.0	11.1	11.60	3.3	25.0	4	85
Av. of 10 years	6.13	13.1	114.46	5.41	9 03	13.46	8.97	9.435	— 0 32	20.32	1	79.0

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR.	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o' cl. A.M.	Average of the maxima	Monthly average	Mouthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o' cl. A.M.
1854	4.5	9	50.6	9°,0	14°,2	19°,1	13°,4	14°,05	1°,1	25°,0	0	77
1855	5.1	11	57.1	7.4	12.2	16.8	11.4	12.10	— 0.9	25 0	1	82
1856	7.0	21	278.0	8.1	12.8	16.7	11.8	12.40	3.9	22.8	0	75
1857	6.6	16	308.5	7.0	10.4	14.5	9.9	10.75	1.7	21.8	0	70
1858	5.7	10	131.2	9.8	14 4	19.4	13.8	14.60	7.0	24.7	0	73
1859	5.8	19	168.5	9.4	13.6	18.7	13.2	14.05	0.6	25.6	0	70
1860	7.0	17	104 0	6.2	10.3	12.4	9.0	9 30	1.4	16.4	0	70
1861	3.5	6	20 7	7.6	13.7	17.8	12.8	12.70	2.5	22.2	0	66
1862	2.9	8	58.1	9.4	14.2	20.5	13.9	14.95	1.9	27.8	0	70
1863	5.2	11	55.7	8.7	13.0	18.6	12.7	13.65	5.3	24.2	0	77
Minima....	2.9	6	20.7	6.2	10.3	12.4	9.0	9.30	— 0.9	16.4	0	66
Maxima....	7.0	21	308.5	9.8	14.4	20.5	13.9	14.95	7.0	27.8	1	82
Av. of 10 years	5.33	12.8	123.24	8.26	12.88	17.45	12.19	12.855	2.45	23.55	0.1	73.0

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	7.0	22	101.0	9°,6	14°,2	17°,8	12°,9	13°,70	4°,5	24°,0	None	78
1855	7.0	23	292.9	8.7	13.1	17.0	12.0	12.85	4.5	28 5		78
1856	7.0	23	382.8	9.5	13.0	17.2	12.5	13.35	5.0	26.6		78
1857	4.6	16	152.5	9.4	15.0	18.6	13.5	14.00	2.8	24.2		73
1858	6 0	18	176.4	9.2	14.4	19.0	13.2	14.10	4.2	31.6		75
1859	6.4	21	206.5	10.2	13.6	18.1	13.3	14.15	6.5	22.5		73
1860	5.0	11	111.2	11.8	17.5	20.5	15.6	16.15	7.8	26.9		68
1861	4.2	8	56.8	10.2	16.3	19.7	15.0	14.95	2.2	27.4		66
1862	5.8	14	158.6	12.2	16.7	20.6	15.3	16.40	8.3	28.9		74
1863	6.1	22	219.0	10.9	14.6	17.8	13.4	14.35	7 0	24.4		78
Minima....	4.2	8	56.8	8.7	13.0	17.0	12.0	12.85	2.2	22.5		66
Maxima....	7.0	23	382.8	12.2	17.5	20.6	15.6	16.40	8.3	31.6		78
Av. of 10 years	5.91	17.8	185.77	10.17	14.84	18.63	13.67	14.400	5.28	26.50		74.1

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	7.2	17	177.2	12°,4	15°,6	20°,1	15,°6	16°,25	7°,2	28°,1	None.	83
1855	5.6	16	204.9	11.6	16 7	21.6	15.6	16.60	7.2	31.2		78
1856	»	10	202.9	13.6	19.0	23.4	17.6	18.50	5.8	33.5		»
1857	3.7	13	121.4	13.5	19.3	23.4	17.6	18.45	7.6	30.6		70
1858	4.7	4	25.0	15.8	20.8	27 1	20.2	21.45	11.1	33.4		69
1859	6.6	16	165.6	13.0	18.4	22.6	16.9	17.80	10.4	34.5		73
1860	5.9	16	118.6	12 6	17.5	21.4	16 0	17.00	7.6	27.1		69
1861	5.4	18	136.6	13 4	19.9	23.6	17.8	18.50	7.1	31.6		69
1862	6.6	10	50.5	13.7	17.5	22.7	16.8	18 20	10.8	32 8		74
1863	6.1	13	78.0	13.4	17.6	22.0	16.7	17.70	6.7	29.2		77
Minima....	3.7	4	25.0	11.6	15.6	20.1	15.6	16 25	5.8	27.1		69
Maxima....	7.2	18	204.9	15.8	20.8	27.1	20.2	21.45	11.1	34.5		83
Av. of 10 years	5.75.	13 3	128.07	13.30	18.23	22.79	17.08	18.045	8.15	31.20		73.55

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o' cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o' cl. A.M.
1854	5.0	12	54.3	14°,0	18°,8	24°,2	17°,9	19°,10	9°,2	31°,0		83
1855	5.6	6	44.1	15.3	20.5	24.8	19.0	20 05	12.5	31.9		76
1856	»	4	61.3	16.0	19.8	24.1	18.4	20.05	11.4	32.8		»
1857	4.6	6	30.0	16.7	21.0	25.1	17.9	20.90	12.8	32.2		68
1858	»	»	»	»	»	»	»	»	»	»		»
1859	»	»	»	»	24.5	»	23.4	»	»	»		67
1860	5.3	13	50.0	14.3	18.2	22.9	17.6	18.60	11.2	29.0		66
1861	»	»	»	»	»	»	»	»	»	»		»
1862	»	»	»	»	»	»	»	»	»	»		»
1863	»	»	»	»	20.6	27.1	21.8	»	»	33.0		»
Minima....	4.6	4	30.0	14.0	18.2	22.9	17.6	18.60	9.2	29.0		66
Maxima....	5.6	13	61.3	16.7	24.5	27.1	23.4	20.90	12.8	33.0		83
Av. of 10 years	5.13	8.2	49.94	15.26	20.48	24.70	19.43	19.74	11.42	31.32		72.0

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	3.8	5	32.0	14°,0	19°,6	23°,9	18°,3	18°,95	11°,1	29°,0		78
1855	4.0	9	65.3	16.7	21.9	27.1	20.8	21.90	10.9	31.6		74
1856	3.3	4	21.1	17.2	22.3	27.8	21.7	22.50	10.7	35.3		64
1857	3.3	9	69.3	15.7	21.0	24.9	19.6	20.80	11.0	32.1		69
1858	»	»	»	»	18.1	22.4	17.2	»	»	»		74
1859	»	»	»	»	23.6	»	22.8	»	»	»		69
1860	»	»	»	13.8	17.1	21.1	16.7	17.45	8.6	26.5		76
1861	»	»	»	»	»	»	»	»	»	»		»
1862	»	»	»	»	»	»	»	»	»	»		»
1863	»	»	»	»	20.0	25.9	20.0	»	»	36.0		»
Minima....	3.3	4	21.1	13.8	17.1	21.1	16.7	17.45	8.6	26.5		64
Maxima....	4.0	9	69.3	17.2	23.6	27.8	22.8	22.50	11.1	36.0		78
Av. of 10 years	3.80	6.7	46.92	15.48	20.45	24 73	19.64	20.55	10.46	31.75		72.0

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	1.0	1	3 7	13°,4	19°,5	25°,0	18°,6	19°,20	7°,5	32°,1	None.	74
1855	4 8	13	128.3	13.4	17.8	22.9	17.4	18.15	9.7	25.1		78
1856	5.0	13	79.3	12.4	16.6	19.5	16.1	15.95	5.0	26.0		82
1857	3.6	10	137.3	14.8	19.5	24.2	19.0	18 50	11.1	28.0		73
1858	4.7	9	101.6	14.5	19.4	25.4	19.2	19.95	9.0	30 1		74
1859	4.2	7	67 8	13.1	18.0	23.2	17.5	17 65	7.4	27.8		75
1860	»	»	»	11.1	15.3	19.6	14.6	15.35	5.7	24.0		75
1861	»	»	»	»	»	»	»	»	»	»		»
1862	»	»	»	»	»	»	»	»	»	»		»
1863	»	»	»	»	15.1	20.7	16.1	»	»	26.0		»
Minima.....	1 0	1	3.7	11 1	15.1	19.5	16.1	15.35	5.7	24.0		73
Maxima.....	5.0	13	137.3	14.8	19.5	25.4	19.2	19.95	11.1	32.1		82
Av. of 10 years	3 88	8.83	86.83	13.24	17.65	22.56	17.31	17.82	7.91	27.39		75.87

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o'cl. A.M.
1854	4.5	15	72.5	10°,0	13°,3	18°,3	13°,5	14°,15	1°,6	28°,1	None	79
1855	6.0	18	317.4	9.2	12.5	16 7	12.8	12.95	4.2	22.9		84
1856	4.7	9	85.1	9.4	14.5	18.0	13.7	13.70	5.6	23.9		80
1857	4.8	13	177.3	10.6	13.7	17.8	13.7	14.20	6.5	25.0		80
1858	5.0	11	65.6	9.6	13.4	18.7	13.6	14.15	0.1	23.4		81
1859	6.0	15	87.9	11.2	15.0	20.0	15.0	15.60	3.3	28 3		77
1860	3.6	13	75.0	8.6	13.1	17.7	13.2	13.15	[0.5	21.6		79
1861	4.2	7	31.9	11 0	15.6	21.4	15.5	16.20	2.5	26.0		79
1862	»	»	»	»	»	»	»	»	»	»		»
1863	5.5	10	20.0	9.8	13.0	18.0	13.3	13.90	7.2	22.0		77
Minima....	3.6	7	20.0	8.6	12.5	16.7	12.8	12.95	0.1	21.6		77
Maxima....	6.0	18	317.4	11.2	15.6	21.4	15.5	16.20	7.2	28.3		84
Av. of 10 years	4.92	12.33	103.63	9.93	13.79	18.51	13.81	14.22	3.50	24.58		79.6

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o'cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to °	Moisture at 9 o'cl. A.M.
1854	6.3	20	162.8	4°,3	7°,0	11°,4	7°,5	7°,85	— 0°,3	19°,8	2	83
1855	5.4	7	37.0	3.4	5.8	11.6	6.6	7.50	— 2.0	14.2	2	87
1856	6 1	12	86.1	4.6	6.8	10.5	7.3	7.55	— 0.3	15.3	3	89
1857	5.5	12	38.3	7.0	9.2	14.6	10.2	10.80	0.3	21.6	0	83
1858	5.9	8	79.3	4.6	7.5	13.2	8 2	8.90	— 5.0	18.9	8	76
1859	4.4	13	100.0	4.8	8.2	13.2	8.6	9.00	— 3.6	22.2	3	80
1860	6 4	17	80.4	6.3	8.5	13.0	9.6	9.65	0.6	18.6	0	75
1861	5 5	16	68.3	5.4	7.0	14.0	8.6	9.70	0.0	18.9	1	82
1862	7.0	13	87.1	4 4	6.4	11.5	6.7	7.95	— 4.1	16 0	3	87
1863	»	»	»	»	»	»	»	»	»	»	»	»
Minima....	4.4	8	37.0	3.4	5.8	10.5	6.6	7.50	0.6	14.2	0	75
Maxima....	7.0	20	162.8	7.0	9.2	14.6	10.2	10.80	— 5.0	22.2	8	89
Av. of 10 years	5.83	13.1	82.14	4.98	7.38	12.55	8.14	8.54	— 1.60	18.39	2.44	82.44

1	2	3	4	5	6	7	8	9	10	11	12	13
YEAR	Nebulosity 0 to 10	Number of rainy days	Depth of rain-fall in millimetres	Average of the minima	Average at 9 o' cl. A.M.	Average of the maxima	Monthly average	Monthly average deducted from columns 5 and 7 only	Absolute minima	Absolute maxima	Number of days on which the thermometer fell to 0°	Moisture at 9 o' cl. A.M.
1854	6.4	21	156.8	3°,7	5°,5	8°,4	6°,0	6°,05	— 3°,6	12°,8	3	86
1855	4.4	10	68.8	1.8	3.7	7.8	4.6	4.80	— 6.8	13.6	9	84
1856	5.7	12	229.2	3.7	5.2	9.7	6.5	6.70	— 1.4	20.0	9	83
1857	3.9	5	27.3	2.0	3.6	10.0	5.4	6.00	— 5.0	14.2	6	82
1858	6 0	18	266.0	4.4	6.0	10.4	7.0	7.40	— 1.6	15.0	4	82
1859	4 5	10	39.4	1.5	3.9	7.4	4.4	4.45	— 5.1	16 0	10	81
1860	8.0	20	217.5	4.1	6.7	10.2	7.2	7.15	— 3 2	18.4	4	80
1861	4.0	8	31.6	3.3	5.4	11.2	7.2	7.25	— 2.2	15.6	5	83
1862	4.6	8	54.9	2.6	4.8	9.8	6 6	6.20	— 2.2	17.8	11	84
1863	»	»	»	»	»	»	»	»	»	»	»	»
Minima....	3.9	5	27 3	1.5	3.6	7.4	4.4	4.45	— 6.8	12.8	3	80
Maxima....	8.0	21	266.0	4 4	6.7	11.2	7.2	7.40	— 1.4	20.2	11	86
Av. of 10 years	5.28	12.4	122.39	2.88	4.98	9.43	6.10	6.22	— 3.46	15.93	6.55	82.8

taken from observations made at 9 o' cl. A.M. and at 2 o' cl. P.M. during the nine months of the winter-season.

YEAR	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
1854	15.6	9.2	6.9	8.2	6.3	12.7	16 6	16.0	17.8
1855	14.6	8.7	5.7	3.8	9.7	10.2	14.5	15.0	19.1
1856	16 2	8.6	7.4	8 7	9.1	12.4	14.7	15.1	21.2
1857	15.7	11.9	6.8	4.9	7.5	11.1	12.4	16.8	21.3
1858	16.0	10.3	8.2	3.2	9 5	11.1	16.9	16.7	23.9
1859	17 5	10.7	5.6	5.3	8.6	11.8	16.2	15.8	20 5
1860	15.4	10.7	8.4	9.2	3.6	9.1	11.3	19.0	19.4
1861	18.5	10.5	8.3	6.1	9.1	11.4	15.7	18.0	21.7
1862	»	8.9	7.3	7.8	8.7	13.6	17.3	18.6	20.1
1863	15.5	»	»	7.6	7.7	10.1	15.8	16.2	19.8
Minima....	14.6	8.6	5.7	3.2	3.6	9.1	11.3	15.0	
Maxima....	18.5	11.9	8.4	9.2	9.7	13.6	17.3	19.0	
Av. of 10 years	16.11	9.94	7.18	6.48	7.98	11.35	15.14	16.72	

For invalids the out-of-door exercise begins at the earliest at 9 o' cl. A.M., and ends at 4 o' cl. P.M.; therefore by taking the average of the observations made at 9 o' cl. A.M. and at 2 o' cl. P.M. one can get a sufficiently correct idea of the temperature of Pau at the different hours where patients go out; in this point of view, the above table of Dr Ottley's is very interesting. (Note of Mr Piche)

II. — Observations collected by Mr Guillemin

The following table sums up the thermometrical observations collected during twelve years, from 1861 to 1872, at the model-farm of Gan, at the director's (Mr Guillemin) instigation.

These observations were communicated by him to the Congress of the « Institut des Provinces » held at Pau in 1873; but in consequence of some misunderstanding, they could not be published in the Reports of the Congress.

Mr Guillemin handed them over to me, intrusting me to publish them when I found an opportunity.

The model-farm, called the model- farm of Tolou, is situated at a distance of nine kilometres from Pau, on the road from Pau to Eaux-Bonnes; the buildings are on a hill, which is 36 metres higher than the road, the latter being at the same height above the level of the sea as the Place-Royale at Pau, viz : 206 metres. The instrument employed was a Melloni thermometer *a maximâ* and *à minimâ*, and the care of the daily observations was intrusted to Mr Delaporte, head gardener to Mr Guillemin.

The thermometer was in the shade and against the wall.

I will only add a few words to explain the meaning of the figures contained in this table :

Each month comprises three vertical columns : the first shows the monthly average of the minima temperatures ;

The second gives the monthly average of the maxima temperatures ;

The third is simply the mean derived from the two others, and gives the average of the monthly temperature.

Below the part of the table I have just described, there are four horizontal lines : the first gives for each of the three columns of the month the mean of the twelve years ; the second gives the highest figure, and the third the lowest figure furnished by the warmest and the coldest out of the twelve years ; — the fourth line shows the difference between the two latter years.

From another calculation I have made, it ensues that the average number of fine days in the different months is the following :

January	17
February	18
March	17
April	19
May	14
June	16
July	20
August	20
September	19
October	19
November	17
December	16

The grey or cloudy days, some of which are very enjoyable, are not comprised in the above figures.

The district of Gan is in the neighbourhood of Pau, and its climatological conditions appear to me to be sufficiently similar to those of our town, a fact which leads me to suppose that this long series of observations may not be devoid of interest to those who wish to gather information on the climate of our winter-station.

MODEL-FARM OF GAN

AVERAGES OF TEMPERATURE
from 1861 to 1872

Mr GUILLEMIN's Observations

YEAR	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
1861	0.5	10.0	5.25	2.4	13.0	7.70	4.1	14.5	9.30	6.7	20.8	13.75	8.1	25.0	16.55	12.2	26.1	19.15
1862	1.6	10.5	6.05	1.6	12.8	7.20	4.9	17.4	11.15	7.4	22.2	14.80	10.3	24.7	17.50	11.7	24.4	13.05
1863	0.8	10.9	5.85	—0.4	12.1	5.85	2.8	13.9	8.35	7.0	19.6	13.30	9.0	20.2	14.60	12.4	24.4	13.40
1864	—0.4	9.8	4.70	—0.8	10.5	4.85	3.8	17.0	10.40	7.0	20.6	13.80	10.0	28.1	19.05	12.0	24.2	13.10
1865	3.3	11.5	7.40	1.8	11.1	6.45	1.0	10.8	5.90	8.9	21.8	15.35	13.0	25.4	19.20	10.8	28.6	19.70
1866	1.3	12.8	7.05	3.4	13.6	8.50	3.2	14.5	8.85	6.9	21.3	14.10	9.3	22.0	15 65	12.4	25.7	19.05
1867	2.5	11 8	7.15	3.6	15.2	9.40	1.3	16.9	9.10	7.8	18.5	13.15	10.0	24.3	17.15	12.2	25.0	18.60
1868	—1.1	9.0	3 95	1.0	12.3	6.65	3.0	13.0	8.00	6.0	15.4	10.70	11.5	26.0	18.75	13.4	28.2	20.80
1869	2.6	14.6	8.60	4.1	14.6	9.35	2.0	10.0	6.00	7.2	21.7	14.45	10.8	24.4	17.60	12.8	27.4	20.10
1870	—0.3	9.0	4.35	1.4	11.1	6.25	2.0	14.0	8.00	3.9	20.8	12.35	10.2	24.0	17.10	13.6	27.2	20.40
1871	—2.2	6.1	1.95	2.6	14.9	8.75	3.1	17.4	10.25	7.9	22.2	15.05	10.8	23.3	17.05	10.0	20.4	15.20
1872	2.4	11.0	6.70	4.2	15.0	9.60	5.1	16.0	10.55	5.2	17.7	1.45	8.0	17.0	12 50	12.2	23.6	17.90
Average....	0.90	10.47	4.79	2.07	13.0	7.54	2.85	14.61	8.73	6.82	20.21	13.52	10.08	23.70	16.89	12.14	25.43	18.79
Hig. temper.	3.3	14.60	8.95	4.2	15.2	9.70	5.1	17.4	11.25	8.9	22.2	15.55	13.00	28.1	19.2	13.6	28.6	20.80
Low. tempe.	—2.2	6.10	1.95	—0.8	10.5	4.85	1.0	10.0	5.50	3.9	15.4	9.65	8.0	17.0	12.5	10.0	20.4	13.05
Difference...	5.5	8.5	7.00	5.0	4.7	4.85	4.1	7.4	5.75	5.0	6.8	5.90	5.0	11.1	6.7	3.6	8.2	6.75

YEAR	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			YEARLY AVERAGES		
	Min	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
1861	13.5	27.3	20.40	15.1	31.1	23.10	12.1	25.8	18.95	10.8	24 0	17.40	3.8	14.8	9.30	2.0	11.1	6.55	7.60	20.30	13.95
1862	14.2	29.0	21.60	12.8	24.3	18.55	11.0	23.6	17.30	9.0	20.6	14.80	2.9	10.4	6.65	1.5	10.8	6.15	7.40	19.22	13.31
1863	14.6	30.3	22.45	15.1	29.7	22.40	10.2	22.8	16.50	8.1	20.2	14.15	3.4	12.9	8.15	1.1	10.0	5.55	7.00	19.00	13.00
1864	15.0	28.9	21.95	14.2	31.3	22.65	11.3	25.0	18.15	7.8	19.8	13.80	6.5	14.8	10.65	0.7	9.1	4.90	7.25	19.90	13.58
1865	15.7	27.0	21.35	15.2	26.3	20.75	15.8	29.3	22.55	10.2	21.4	15.80	4.6	15.9	10.25	—0.5	10.0	4.75	8.31	19.91	14.11
1866	14.4	26.7	20.55	13.4	25.6	19.50	11.2	23.2	17.20	9.8	20.4	15.10	4.3	14.4	9.35	4.6	10.0	7.30	7.85	19.22	13.54
1867	13.2	26.5	19.85	14.3	27.6	20.95	11.4	23.6	17.50	6.5	18.0	12.25	1.6	13.2	7.40	—0.6	8.0	3.70	7.00	19.05	13.03
1868	15.7	30.7	23.20	14.3	27.4	20.85	13.0	28.0	20.50	8.3	19.0	13.65	3.6	14.1	8.85	6.6	17.6	12.10	7.77	20.13	14.45
1869	17.4	30.8	24.10	15.3	27.5	21.40	13.5	25.0	19.25	8.0	19.6	13.80	3.0	13.8	8.40	0.0	9.7	4.85	8.15	19.09	13.02
1870	16.3	30.0	23.15	14.7	25.8	20.25	12.9	27.4	20.15	10.0	21.1	15.55	3.2	13.4	8.30	—1.3	6.4	2.55	7.20	19.27	13.24
1871	14.0	26.5	20.25	15.0	27.3	21.15	13.8	24.8	19.30	8.1	20.0	14.05	2.4	11.7	7.05	3.4	5.1	4.25	6.82	18.30	12.56
1872	15.2	26.7	20 95	14.7	25.3	20.00	12.5	24.2	18.35	7.1	16.0	11.55	5.0	11.0	8.00	3.3	11.6	7.45	7.90	18.00	12.95
Avera.	15.0	28.53	21.77	14.5	27.41	20.96	12.4	25.25	18.83	7.80	20.0	13.90	3.70	13.38	8.54	1.73	9.95	5.84	7.52	19.28	13.40
Hi. te.	17.4	30.8	24.10	15.3	31.1	23.10	15.8	29.3	22.55	10.8	24.0	17.40	6.5	15.9	10.65	6.6	17.6	12.10	8.31	20.30	14.45
Lo. te.	13.2	26.5	19.85	12.8	24.3	18.55	10.2	22.8	16.50	6.5	16.0	11.55	1.6	11.0	6.65	—1.3	5.1	2.55	6.82	18.00	12.56
Differ.	4.2	4.3	4.25	2.5	6.8	4.55	5.6	6.5	6.05	4.3	8.0	5.85	4.9	4.9	4.0	7 .9	12.5	9.55	1.49	2.30	1.89

B. — Medical Climatology

I am now about to speak of observations I have made on the *strictly medical climatology* of our region.

I. — I have nothing particular to mention on the AFFECTIONS OF THE DIGESTIVE ORGANS, except that, with a certain number of patients of the upper classes, I have noticed a sort of atony of the digestive functions, the symptoms of this atony consisting in a rather frequent uncomfortable feeling, a tendency to sleep during digestion, habitual « migraine », etc. Whenever these symptoms become sufficiently intense or frequent, they constitute dyspepsia, a disease which I have often observed in our region. Some patients, but, I must say, only a few, have even told me that they only experienced these digestive inconveniences in our climate, or, at least, that they felt them here more severely than elsewhere.

As a compensation, I have often noticed the favourable influence of our climate on frail and delicate children coming from northern countries, submitted before to the influence of a cold climate, and who, if they had been left in their own country would undoubtedly have become a prey to scrofula or phthisis. It is quite marvellous to see these languishing little creatures recover their health, to watch them as, under the influence of exercice in the sun and in the open air, their appetite, their strength and ther gaiety return, while they recover their bright complexion and gain flesh. Scarcely a year goes by that, under my own notice, one of these little resurrections does not take place, and this without

having recourse to any powerful therapeutical action. It cannot be said that scrofula is entirely unknown, but it is very seldom observed in our region.

Every summer, I am called upon to attend several cases of more or less severe enteritis, which occur in children either prematurely weaned, or living under anti-hygienic influences. But I have not observed that these cases of CHOLERA INFANTILIS were either more frequent or more severe than anywhere else.

II. — The AFFECTIONS OF THE RESPIRATORY ORGANS are often attended with peculiarities quite worthy of mention.

1° For instance, LARYNGISMUS STRIDULUS is comparatively frequent among children ; scarcely a single year goes by, when the weather turns to cold, that I am not called upon to attend several of such cases; and as this false croup is accompanied by a cough identical to that of real croup, the consequence is, that such cases alarm not only the parents, but even the physician himself. It would be out of place to insist here on the differential diagnosis of these two affections ; besides I have no particulars to mention on the subject which are not familiar to everybody. But I think I can safely state from my own experience, that in some cases, — rather unfrequent ones, I confess, the diagnosis is most difficult. I recollect having been called upon, in the beginning of my practice, to attend a child three or four years old, where the croupy cough was accompanied by a slight pultaceous tonsillitis. Although I may be allowed to say that, even then, I had a good experience of the diseases of children, and in this particular case I had made frequent and minute examinations, I quite believed in an attack of real croup. I merely administered an emetic however, quite prepared to more active measures on the slightest menace of asphyxy.

The next morning however, I had no difficulty whatever in ascertaining the real nature of the disease. I vainly tried to avoid the credit of having saved the child's life ; in spite of what I told them, the parents would not believe me, and overwhelmed me with their gratitude. I have found many others in later years, who did just the reverse, even though I thought I had a claim to their gratitude.

Although I cannot pronounce an absolute affirmation on the subject, this is what I have often observed :

False croup appears chiefly when the weather suddenly turns to cold, as also on those cold winter nights which, in our region, often follow a comparatively warm day. On the other hand, I do not recollect having ever observed a case of REAL CROUP under such circumstances ; the latter I have hardly ever seen except after a long series of rainy days ; and yet I have always been surprised at the slight degree of contagiousness it possesses in our region, as well as its limited propagation in the isolated *foci* in which it has developed itself.

2° When I first came to Pau, I can state without exaggeration that I had a real terror of DIPHTHERIA and CROUP. I had been taught by my illustrious master Trousseau, whose lectures I had attended, that this dreadful disease spared no country whatever, and could rage anywhere with the same implacable severity. I could not forget the really dreadful case, which, through him, has obtained universal notoriety, of an unfortunate peasant of the village of Tremblevif, in Sologne, who remained *one of the two survivors,* in a farm that contained seventeen persons and had been depopulated by diphtheria.

And yet, during twenty years practice in this region, I have not observed a single case of MALIGNANT DIPHTHERIA, nor have I seen diphtheritic pharyngitis or croup either

become epidemic, or extend beyond a very limited centre. Two years have sometimes elapsed without my seeing a single case, and I have never had to attend more than two cases of croup in the same year. Even if I take into account other cases, which I was not attending, but that came under my notice, I do not know that, for the last twenty years, we have seen at Pau more than four or five cases of croup at the same time, in the same year. During the whole of my practice at Pau, I have only had to perform *tracheotomy in four cases*, out of which *only one ended* fatally, whereas the *three* other patients were *cured*. Such facts allow us to conclude that the various diphtheritic complaints, when observed in our region, are infinitely less contagious than they generally are in other regions, Paris or the Sologne, for example. I can only remember one adult taking the disease through contagion, and he was no other than one of our most amiable « confrères, » Mr Boulin, who afterwards became our neighbour at Morlàas; he was attacked with diphtheritic pharyngitis, after performing repeated cauterisations on several patients he was attending at Garlin or in the neighbourhood, where he was then practising.

Whether in the future, in some part of our medical region, more frequent and also more severe cases may, or may not, develop themselves, is a question that it would be hardly safe to decide. I can only say that I have observed the same slight degree of contagiousness elsewhere than at Pau: about eighteen months ago, I was called upon to attend, in a small town of the department, two little children who, were very dear to me, and who both died from croup in twenty-four hours. I have been able to ascertain, through precise and trustworthy information, that no other case of croup or diphtheritic pharyngitis was observed either at the same time or later, in the same town or its neighbourhood.

There is one particular feature, however, that I must mention on this occasion, because in my opinion it is very important When the two children were taken to the churchyard, their funeral was attended by other children of ten or twelve years of age, to whom was intrusted the dangerous mission of carrying the coffins from the house to the church, the distance being about three or four hundred metres ; and yet not one of these children took either diphtheritic pharyngitis or croup. Whether such would have been the case or not elsewhere, and especially in places where malignant diphtheria is frequently observed; I can hardly say. At any rate, such a custom ought to be condemned by the hygienic laws of every country in the world ; for all medical men know that contagious diseases of children are extremely frequent; and nothing shows us that the germ of the greater part of, or even of all such diseases, cannot be transmitted after death. On the contrary, Ozanam (1) tells us, quoting an English author, that « grave-diggers who had disinterred *the corpse of a man who had died from small-pox ten years before* were affected themselves with that very disease. »

The various examples above mentioned are at all events sufficient to show that, as a rule, the various diphtheritic affections, when observed in our region, possess a comparatively very slight degree of contagiousness. Such is undoubtedly the reason why the development of the disease is limited, and why only a very few children are affected at the same time.

3° Simple acute bronchitis, — I mean of course the cases that bear no relation whatever to tuberculous diathesis, — is a most frequent disease everywhere, the features

(1) Hist. méd. gén. et prat. des mal. épid. t. I ; p. 65. 2e Ed. Paris 1835.

of which however are often considerably altered by climatological influences. In the Paris hospitals, those who have walked them have had frequent opportunities of making this observation, — it is generally mild, and yet, it has a protracted, it not very serious damaging influence on the general system. It is usually accompanied by a more or less intense fever, and the bronchial secretion may become very abundant for days and weeks. Cases ending fatally, even under ordinary climatic circumstances, are not altogether exceptional; and we all know that under certain hygienic or meteorological influences, for instance after the siege of Paris, bronchitis, although entirely free from any such intervening complication as pneumonia or tuberculosis, frequently ends fatally. I appeal, on this subject, to the recollections of all those of my « contrères » who made their observations in the same hospitals as I did myself, and I trust they will not find the above assertions in any way exaggerated.

Such a preliminary explanation is by no means unnecessary, since it enables us better to illustrate how things take place in our region, where acute bronchitis is, in the immense majority of cases, limited to the middle-sized bronchial tubes, and very seldom reaches the minute ramifications of the air-passages. Besides, whatever be the form it takes, it is very rarely attended by the abundant secretion I have just mentioned, and I do not know of *a single case* in which it ended fatally. Of course, in our climate as well as in many others, pneumonia sometimes exhibits at first the symptoms of bronchitis; but they are very soon superseded by those of real pneumonia, which is no more innocuous here than anywhere else. But such cases cannot, on any account, be classed under the heading of simple bronchitis.

I have even a very precise recollection of having observed, some three years ago, two cases of capillary bronchitis, sho-

wing in their highest degree the symptoms of the variety that is described as suffocating catarrh ; both patients were children, from six to eight years old ; both cases terminated in a laborious recovery, after the anxieties and long alternatives of a struggle which lasted, uninterruptedly, for six or seven consecutive weeks.

4° I must now allude to another subject, difficult in itself, more difficult still for a physician who is bound to support every one of his assertions with proofs, — if he does not, he is sure to be distrusted on all sides, — when it happens that local interests of a very secondary importance are, as in the present case, unavoidably connected with the study of a particular climatological question : the subject I am about to treat is *the influence of our climate on the course of* PULMONARY PHTHISIS. Whatever the difficulties may be, a writer can under no circumstances of any kind, fail to discuss a question that naturally and necessarily arises from a given subject. Patients, besides, must sooner or later derive some benefit from such discussions, provided the writer takes proper care not only to establish his judgment on a scrupulous and unprejudiced observation of facts, but also to facilitate judicious criticisms, by simplifying as much as possible the means of controlling every assertion in any way liable to controversy. On one hand, it would be an important omission, and it would show a want of moral courage unworthy of the profession, to leave out pulmonary consumption in a climatological review concerning one of the French winter-stations. On the other hand, can any better control be either looked for, or obtained, than that which is the result of an appeal made, not to the patients themselves, but to enlightened « confrères » practising in the same town, and, for this very reason, hardly inclined, as a rule, to yield to any feeling of partiality through excessive complaisance. Should

even this first control seem unsatisfactory to more punctilious minds, foreign « confrères » are at liberty to judge for themselves, in a definitive manner, such assertions as may undoubtedly be erroneous, but have at least been brought forth without any reserves and with the most scrupulous impartiality. Such a double jurisdiction is certainly the safest possible guarantee, and is sure to lead without delay to a correct opinion.

It is only incidentally I have been led to write on this important subject, which, if thoroughly discussed, would require much more development than I can give in a few lines. I therefore do not intend to insist on many details that would be much better suited to a complete monograph of the climate of Pau, and which, besides, have already been the subject of the conscientious investigations of several foreign, and therefore disinterested, « confrères » ; still, I cannot shrink from the necessity of singling out certain features of this difficult study. I undertake this task with a firm and undeniable conviction that, in studying the question, I have constantly and solely had in view the welfare of the patients, the only aim to be pursued by a truly honourable member of the profession.

Every climate, from its own nature, is complex ; it comprises a certain number of elements, the particular grouping of which is a characteristic feature of this or that country, but of no other. Great analogy may be imagined, and is undoubtedly found, between different climates ; but two strictly identical climates do not and cannot exist in the world.

All other conditions being the same, the climate of one region will differ from the climate of another, either distant or at proximity, according to various causes, such as the altitude, the mean temperature, the amount of moisture in

the air, the direction of winds, etc., each and every one of these causes being liable to vary, and *indeed varying* in different places. The exact determination of these various factors is therefore an essential part of any climatological analysis, and it will be easily understood that nothing short of such an analysis will lead us to elucidate, sooner or later, a most difficult and most interesting question, viz : the more or less prevalent influence that should be attributed to each of those factors in the effects produced on a living organism.

This question, however, is far from taking rank among the first problems we have to solve, the logical order of which can hardly be interfered with, without running the risk of never arriving at any precise demonstration. Moreover, we can examine it separately from all the others, without thereby endangering the success of other investigations, on subjects of a more immmediate and more practical interest. Thus, before inquiring whether the advantages of a climate are due to its temperature, or to some other circumstance, we have to elucidate many other points, and to ascertain first of all whether it is, or is not, really beneficial in cases of pulmonary consumption, or of other diseases. In this point of view, as in many others to be mentioned hereafter, climate is « *indecomposable* » ; we must take it as it is, and limit ourselves to the scrupulous observation of its effects on the system.

The case is exactly the same with hydrological questions: of course the chemical analysis of mineral waters should never be neglected ; and yet, it is not sufficient to enable us to foretell the physiological or therapeutic effects of such waters: information of this kind can only be obtained through clinical observations. Were we to take, in our every day materia medica, the most simple chemical combination, we should soon find that, far from supplying us with any

correct data, its elementary constitution would only lead us into error, if we tried to derive its therapeutic effects from its composition. Nitric acid and potash, if applied separately on living tissues, will corrode them ; yet, nitrate of potash, which is a mere combination of both, may be applied without any danger on the whole surface of the body ; and, if taken at ordinary doses, it is a perhaps somewhat uncertain, but at any rate, a most harmless diuretic medicine. The following is another example : very probably, iodine is alone active in the potassæ hydriodas that we prescribe to syphilitic patients ; how is it then that ferri iodidum does not possess the same anti-syphilitic power ? how is it again that, with such patients, we cannot give simple tincture of iodine, instead of potassæ hydriodas?

I have only mentioned these examples to illustrate the fact that it is utterly impossible for us to foretell, with any degree of accuracy, the influence of climate on the system, if we deduct our judgment merely from the fact that we know its chief factors. Each climate must be considered as a kind of combination, or, as in mechanics, a resulting power ; it acts like a concrete being, influencing our organs in its own manner, and the effects produced upon them in some regions are different from those it produces in others.

After this preliminary statement, we may proceed to examine, according to their logical order, the principal questions which every new climatological investigation implies. By so doing, we shall better perceive that, in climatological questions, as in many others, we cannot expect to find the immediate solution of every point, and that we must postpone our judgment on several problems, that can only be elucidated by protracted and scrupulous observation, at the expense of a great deal of time and patience.

When, as in pulmonary phthisis for example, we wish to submit a morbid affection to serious investigations of this kind, we are bound to inquire:

§ 1. *Whether a given climate is really beneficial, indifferent, or noxious*;

§ 2. *If discovered beneficial, under which particular circumstances it is most usefnl; to what period of the disease it is best appropriated; during how long (in talking of a medicine, we would say at what dose) it ought to be employed;*

§ 3. *To which of its component factors, such as altitude, dryness, temperature, direction of winds, etc., etc., its beneficial influence is chiefly due; by what charasteristic features such a climate differs from other favourable climates; and what motives should lead us to submit a particular form of the disease under consideration to a given climate, in preference to any other.*

§ 1. On this climatological question, we cannot expect to derive any precise information from statistical statements connected with foreign patients observed in each winter-station; such statements cannot possibly be realized. On the one hand, our professional duty forbids us to publish, or even to let anybody guess the names of our patients; and this prohibition is enough to render any kind of control a mere fallacy, especially when a large number of cases have to be examined. On the other hand, even if we admit the fact that each physician, in each of the winter-stations, publishes a complete statistical statement of his cases, how are we to decide that all such individual statements are entirely comparable, and that they have been established everywhere,

not only with the utmost good faith, but also with the same careful impartiality and precision? How then could we hope, as far as these winter stations are concerned, to make up a general and demonstrative statistical table with so very uncertain and so very different documents? Neither can we hope to derive any useful comparison from such various general statistics.

But there are other means of ascertaining whether a climate is beneficial in cases of pulmonary phthisis. For instance, there can be no doubt that, if a climate is really useful in confirmed cases, it ought, *a fortiori*, to be equally useful to prevent the development of the disease in predisposed persons. And if such is really the case, we ought to have a less considerable number of native phthisical patients in our climate, and their number should decrease when the cases under consideration are among the middle and upper classes.

Starting from this fact, I have collected in the most careful and scrupulous manner all the well authenticated cases of death from pulmonary phthisis that I have observed at Pau, among the natives of *the middle and upper classes only* (1) from the 26 th of december 1859 to the present day (*a period somewhat over twenty years*). I have found the number of such cases to be exactly 15, and yet, I have

(1) As I wish to avoid all misunderstanding on the meaning of the words « *middle and upper classes*, » and to convince the reader that I have endeavoured to exclude anything like arbitrary proceedings from this important classification, I beg to state that I have not only consulted my personal notes, but I have also perused various subscription lists, that are published every year by the town-council of our city for the extinction of mendicity. On these lists, several persons put down their names for the sum of 25 centimes (twopence halfpenny). This will show that I have considered as belonging to the middle and upper classes any person who is able every year to give alms or superfluous money, however small the amount may be.

put down on my list three patients who were strangers to our town, because I believe, although I am not certain of the fact, that they had already been residing at Pau for several years when they were attacked with pulmonary tuberculosis.

Although my assertions cannot have the same authority when I speak of facts I have not witnessed, I have made it a point to ascertain the approximative number of other cases of death, arising from the same cause and during the same period. I have therefore taken advantage of the favourable circumstances under which a medical man is placed by his extensive acquaintance and old friends, to gather information as carefully as possible from these, and find that *twelve other fatal cases* occurred during that same lapse of twenty years. I do not mean to affirm that this is a correct number ; I believe however that I am not much mistaken, if I take about *forty* to be the total number of fatal cases from pulmonary consumption in the middle and upper classes ; but even if we suppose the discrepancy between this approximative calculation and more precise figures to be as considerable as possible, the total number of such fatal cases will certainly not reach *sixty*. And yet, if we take the latter number to be correct, we shall find, IN THE COURSE OF ONE YEAR, *barely three fatal cases of* PULMONARY PHTHISIS *in the middle and upper classes of the inhabitants of Pau, the average population being* 25,000 *inhabitants* (now about 30,000). Such calculations are sufficient in themselves to enforce upon the most sceptical mind the advantages of our climate in the treatment of that dreadful disease.

The same estimate cannot unfortunately be given concerning the fatal cases of the poorer classes, and this impossibility is easily accounted for : the town of Pau, in which no industry of any importance has ever been developed, and

the renown of which, as a winter-station, cannot be traced back to more than thirty or thirty-five years, has but a limited working population, which can hardly be called native, since it is constantly renewed. It is among servants alone, most of whom are strangers to our town, and often come from very distant regions, that we can find, and sometimes do find, cases of pulmonary phthisis, and even then, they are very scarce. Would statistics have any value, bearing, as they must do, on a population which is not only floating, but also cosmopolitan?

At the hospital, if we try to get a correct appreciation, we meet the same difficulties; the greater part of the phthisical patients there belong to that class of servants I have just mentioned, some of whom even come to Pau expressly for the pulmonary affections under which they labour. Hardly a few weeks ago, when I was still attached to that establisment as junior physician (1), I endeavoured to collect various documents, in order to ascertain the exact number of phthisical patients admitted to the house every year. The result of an investigation, kindly made at my request by Madame la Supérieure of the Hospital, shows that this number is far from being considerable. For instance, during the course of last year (1879), which she takes to be an average year, the whole of the native phthisical patients admitted amounted to 16, the greater part of whom are still alive. It is out of my power to give precise data on previous statistics, which are impossible to establish, for want of proper medical documents: on this point the only information I could get, the evidence of which cannot be doubted, is that the number of admissions to the hospital is, at present, comparatively more considerable than it was twenty-five or thirty

(1) Dr Duboué is now senior physician to the Pau hospital.

years ago. This may be due to the fact that, public charity being very liberal in our city, the poor flock here more than they would elsewhere; or, according to a more probable explanation, that has been suggested to me, a certain number of young foreign invalids may have left behind them, at Pau, the seed of an offspring much more likely hereafter to inherit their diseases than their riches. We should then have no reason to be surprised, if such unlucky offspring, to the discredit of both their begetters and our climate, were, at the present day, contributing to increase the number of indigent phthisical patients, both in the hospital and in the town.

I have already pointed out how difficult, or even impossible, it is to make a complete statistical statement, indicating the results obtained in a given winter-station from the observation of foreign phthisical patients; but, even supposing such a statement to have been made with the most undeniable correctness, it has no importance, so long as it remains isolated from others. It is obvious that statistical tables of such a kind can hardly be of any use, unless compared with similar tables, kept with equal care and exactitude in the various winter-stations. Besides, in the case of each station, this comparison ought to bear on the different forms that pulmonary tuberculosis may assume. So long as these various elements are not collected, it is impossible to make a safe and judicious choice between different stations, one of which has to be recommended to an invalid as being the best suited to particular circumstances; and such uncertainty must indeed be experienced in most cases.

There is, however, an indirect method, by aid of which we can gather precise information on the comparative value of different climates; the same method leads us, in therapeu-

tics, to decide upon the degree of confidence we should have in one medication or another ; it may also be, and it is sometimes, applied to the elucidation of a dubious diagnosis ; it consists in what we might call the « *observation of contrasts ;* » by this means, we try to discern, and especially to instigate, rapid and generally striking alterations which are habitually the result of a sort of *interrupted*, or, to speak more plainly, of a now taken up, now abandoned, medication.

On this point, however, a short explanation may not be unnecessary.

In both cases, the problem we have to solve is exactly the same ; we want either to detect the nature of the disease, in a dubious case, by prescribing a medicine, the effects of which are as certain as they are well known, or to discover the real therapeutic action of a medicine, (or of a climatic influence, which comes to the same thing) upon a morbid affection of a well determined nature, for instance, upon pulmonary tuberculosis.

In the first case, we administer the medicine until the symptoms against which we want to react have gradually disappeared, or, at least, considerably abated, and there we stop. If the symptoms re-appear, as they often do in protracted and insufficiently treated diseases, we renew the same medication, and if a rapid change for the better is again observed, the chances of being right are much in our favour, that is of being on the trace of the correct diagnosis. Such probability is considerably increased, and will soon turn into a certainty, it we can excite at short notice, and several consecutive times in the same patient, rapid and alternative changes, now for the better, now for the worse ; it is thus we proceed, or at least may proceed, in supposed cases of syphilis, of larvaceous fever, etc., etc. — In the

second case, we have to decide upon the curative influence of a more or less simple medicine, or of such a complex agent as *climate* considered as a whole. We then can, and even must, have recourse to the *observation of contrasts*, which, in the present case, will spontaneously strike the physician's attention, and lead him, much more rapidly and safely than would any statistical returns, to that degree of practical certainty which, in every serious case, is indispensable to the welfare of the patient.

Undoubtedly, a medical man is at liberty to abstain from asserting his opinion, as long as there is any uncertainty in his mind regarding the best possible solution of a question, even tho' a thorough knowledge of this question be most important to him. But when he has made up his mind to speak, he ought, upon no consideration whatever, to allow himself to be guided by any other motive than the interest of his patients, or else he would be but an unworthy member of our noble profession. I am perfectly aware that judgments like the following should never be pronounced in an inconsiderate manner; but I can affirm, after having applied the above mentioned method, « the observation of contrasts » a great many times to the study of our climate, I can safely affirm, with the most energetical conviction possible, that this method has often demonstrated to me, in an undeniable manner, the beneficial influence of our climate on pulmonary tuberculosis.

Although I cannot support my assertions with the names of my patients, I trust nobody will question the authenticity of a few cases, the more striking peculiarities of which I am now about to report. I could easily mention a great many more, but I think it will be sufficient to relate those which may be looked upon as typical:

Case I. — About eight years ago, a patient of mature age was addressed to me ; he had all the symptoms of pulmonary phthisis in its first period, the respiratory murmur being almost entirely absent in the whole of the right apex, and no rhonchus being audible. After five or six weeks spent at Pau, he could hardly have been recognized ; day after day, his appetite and strength returned, and he gained weight ; so much so that, at the end of four or five months, he recovered all the appearances of strength and health. The local state itself had undergone such a change for the better that nothing more than a slight diminution of the respiratory murmur could be detected in the very spot where, some months before, it was hardly audible.

This patient went home towards the beginning of the spring, and his health declined in the course of the autumn ; he returned to Pau in the beginning of the winter, and was then in about the same condition as the year before. Now, if we only suppose such alternate changes, sometimes for the better, sometimes for the worse, reappearing and disappearing in the same season, and to the same extent, for seven or eight consecutive years, with only a few slight differences, we shall arrive at a very correct idea of this case. The patient is still, at the present day, at the same period of the disease as the was eight years ago, viz : the congestive period, which sometimes gives rise to slight hæmoptysis ; rarely, or almost never, have I found, for any length of time, a sub-crepitant rhonchus indicative of tuberculous colliquation.

For the sake of accuracy, I must add, however, that, especially for the last three years, the change for the worse began to take place even at Pau, in February or March, and became more and more accentuated during the summer and autumn. But, on one occasion, this patient had to go home, on urgent business, in the very middle of winter. He left Pau in the best possible state of health, took every possible care to avoid cold, both during his journey and on his arrival, and, when home, never once left his room. After an absence of eight or ten days, on his return to Pau, however, his health had so much declined, that again one would hardly have recognized him ; in the interval, the respiratory murmur had once

again become obscure on the affected side. In fact all the symptoms had reappeared, and yet, no imprudence had been committed, no moral emotion had intervened, that could account for their reappearance. Again, after a very short time, a few weeks at the outside, the patient got better and once more recovered what he had lost.

Case II. — During the winter of 1875, I was called upon to attend for the first time a Belgian gentleman, who was then about fifty years of age, and presented the general and local symptoms of pulmonary phthisis at its second period. The general health especially was very bad, and contrasted with the limited extent of the pulmonary disorder ; the seat of the disease was on the right side, and in the posterior part of the chest, in a line with the spine of the scapula, towards the hilum of the lung, where auscultation revealed the existence of moist sub-crepitant rhonchus with large bubbles. The disease, which only began some months before, had progressed rapidly, and gave rise to slight, but often repeated, hæmoptysis. There was considerable weakness, and during the first three or four months of his sojourn at Pau, my patient had been scarcely strong enough, on rare occasions, to go out for a drive. His family was much alarmed, and I confess I could not help sharing their anxiety.

A considerable improvement, however, was soon perceptible, both in the general and the local state ; and during the course of the fourth month of his stay at Pau, the patient was able to go out for a drive almost every day. He used to come to me, at intervals, for medical advice; but he was still too weak to ascend the two stories of my house, and generally remained at the door. I feel bound to enter into these particulars, to illustrate his state of weakness on his arrival at Pau. Before leaving, however, at the end of the first winter, he was already strong enough to go out, now and then, for a short walk. The sub-crepitant rhonchus in the affected lung was now more limited and less audible.

The improvement thus obtained, however, was far from complete, and did not last very long. The general health declined during the course of the summer, although it did not undergo the same

excessive impairing that had struck me some months before. The consequence was that, a long time before the cold weather set in, my patient returned to Pau, where he spent a second winter, under comparatively much more favourable circumstances than the preceding year. Once again, but much more rapidly, he recovered his strength ; he could frequently go out walking ; while the local state was undergoing a corresponding improvement, the stethoscopic signs, which had been formerly observed, having disappeared, and being superseded by a mere roughness of the respiratory murmur.

The patient felt so well that, in spite of my advice, he insisted upon returning home early in April. Such a sudden and complete change, however, took place in his health that, towards the end of the same month, about three weeks after he left, he came back to Pau, when I was struck with the amount of strength and weight he had lost, and also by the return of the stethoscopic signs, the very trace of which had disappeared a few weeks before. Once more, an improvement took place, being so rapid that, in the beginning of June, we recovered what had been lost.

The next summer (1877), the patient was much better than the year before ; he returned to Pau towards the middle of autumn in a very good state of health. In the course of this third winter, he was not once really unwell ; he hardly ever coughed, except at long intervals, and he was able not only to go out every day, but to take long and frequent walks, not less than eight or ten kilometres each. In short, he had recovered his strength and health, and the normal respiratory murmur was now heard in the upper and internal part of the infraspinata fossa, in the very spot where I had formerly perceived stethoscopic signs indicative of a limited tuberculous softening.

The consequence of such an unhoped for improvement, or even apparent cure, was that I told my patient he could dispense with returning the following winter ; I however, kept him at Pau, until the beginning of May, when the Paris Exhibition opened.

On leaving Pau, between the 10th and the 15th of May, he was in the best possible state of health, and I was quite surprised, when, a fortnight later, I received from a member of his family a

letter in which I was informed that cough and intense fever had set in, on the third day after the patient's arrival in Paris, and that he had been obliged to start for home, as soon as these symptoms, which had threatened to become serious, had been successfully combated.

What took place during this relapse, I do not know ; the fact is that the patient and his family were considerably alarmed, and their attention was particularly struck by this renewal of more or less serious symptoms, that constantly reappeared when the patient left our region, and as constantly disappeared under the very first influence of the « sunny south ; » accordingly it was decided by the family, even without professional advice, that, until further notice, the patient should spend every winter at Pau. He sometimes says to me : « I am condemned for ever to a temporary exile ; as soon as the weather turns to cold, my family, although it grieves them to do so, drive me away from home, and I am obliged to obey ; for I understand but too well that if I did not make up my mind to leave them for a few months, I should run a great risk of leaving them for ever. »

This patient has now spent two more winters at Pau, and I have never been called upon to attend him, except for slight ailments ; but, at long intervals, when attacked with slight bronchitis, I can hear, in the spot which was primitively affected, a weak sound of « *clapet*, » which has superseded the former moist rhonchus ; but this does not prevent him either from going out every day, in all weathers, or from enjoying all the advantages of excellent health.

Case III. — For the last eight years, I have attended a little patient, now a young man, who, on his arrival at Pau at the age of eleven, looked frail and languishing ; he had been suffering for some months from obstinate cough, and showed all the symptoms of pulmonary congestion in the whole of the right apex, where an almost entire absence of the respiratory murmur, without the adjunction of any abnormal sound, was particularly noticeable. As early as in the course of the first year, a considerable improvement took place, and, after the patient had spent a second winter at Pau,

the respiratory murmur, although il had not entirely rccovercd its usual sound, was very distinctly audible in the pulmonary rcgion which had been formcrly invaded by congestion.

As the child's mother was anxious to havc a precise notion of the date at which she might dispense with taking her son for the wintcr to some southcrn climate, I thought I was justified in advising her to take him back to his own country for the following year. But when she perceived that I still discovered a slight comparativc wcakness in the right apex, she made up her mind to spcnd a third winter with her son in our climate. Thc boy very soon regained the lost time, and considerably dcvelopcd himself, whilc the respiratory murmur was recovering its usual sound on the affectcd side. This time, I took into consideration the family interests that obliged this lady to return homc, and I had no hesitation in advising her not to bring back her son to Pau the ncxt year; I however stipulated that she should return without delay, if she happencd to notice the slightcst menace of the former pulmonary symptoms, or even a somcwhat perceptible altcration in his gcneral health.

She did her best to follow my advice, but she very soon noticed that the child's health was again declining, and she would evcn have rcturned to Pau much earlier, but was prevented by long and continuous rain that fell in her country ; as it was, she could only reach Pau towards the end of january. Her son was again affected with pulmonary congcstion ; the stethoscopic signs showcd themselves in the same spot as formerly, but were, however, somewhat less intense and lcss extensive. A rapid improvemcnt again took place, both in the general and in the local state, and, thrce months later, this little patient enjoyed very nearly the same degree of strength and health as he had done the year before.

Under such circumstances, I had no difficulty in persuading this lady that a protracted sojourn in our region was nccessary for the consolidation of her child's health. From that date, the boy has spent every winter at Pau, and, besidcs getting rid of every sign of his former pulmonary affection, he has rapidly developed himself, and acquired even a more vigorous constitution than is usual with young men of his age.

Case IV. — The following case, although not so demonstrative as the preceding, is very suggestive, and the information we derive from it is one of those that always leave a deep impression in a physician's mind.

I will here sum up in a few words the case of an interesting young lady, whose father died at Pau of pulmonary consumption several years before I attended her. This young lady had two brothers, one of which was very delicate, and, a short time after his father's death, had shown several alarming pulmonary symptoms. The family had returned to Pau on his account, and, although he is not the principal person in this case, I may as well say at once that, after a great deal of careful attendance, he finally recovered not perhaps a very vigorous constitution, but, at any rate, a satisfactory state of health for ordinary life.

As to the young lady I am about to allude to exclusively, she had spent four consecutive seasons at Pau, without ever taking the minute hygienic precautions I used to enforce upon her brother, the latter having come to Pau expressly for his health. Nothing denoted in her the least morbid tendency, except a somewhat slow physical development ; and even this was by no means excessive. Once only she required serious attendance, and that was in the course of the third winter at Pau : after a long exposure to the rain, and having got her feet wet during a walk, she was suddenly taken, while I happened to be calling upon her brother, with very slight hæmoptysis ; after some slight efforts to cough, she merely expectorated two or three sanguinolent sputa Nothing else occurred beyond this insignificant hæmoptysis which, neither reappeared on the same day, nor on the following day. Acquainted as I was, however, with the pathological history of the family I hardly need mention that this fugacious symptom most forcibly struck my attention. I not only auscultated the patient at once with the minutest care, but I repeated this examination for several days running, and later again at more or less distant intervals ; but I never could perceive the slightest alteration, either in the rhythm, or in the natural sound of the respiratory murmur. This accident, besides, was not attended by any general disorder, nor was the health in the slightest degree impaired.

This young lady not only went through the remainder of the winter without any other trouble, but returned to Pau the next season, which she spent without either hæmoptysis or any other pulmonary symptom. As her brother's health had become sufficiently improved, her family did not return the following year. In the course of the late winter, however, the unfortunate young lady was carried off in less than six weeks, by galloping consumption. I heard later from one of the members of her family, that the disease had originated in a second hæmoptysis, quite as slight and as insignificant as the first. She was again on this occasion submitted to the examination of a physician very familiar with pulmonary diseases; but, this time again, auscultation, though it took place a few hours after the accident, never revealed the least stethoscopic sign.

After a few days, however, she was taken with a slight cough, her health quickly declined, pulmonary disorders appeared in the apex of one lung, and progressed so rapidly as to lead, in a few weeks, to the fatal and grievous end I have already mentioned.

I admit, of course, that such a case, taken alone, does not suffice to solve the difficult question regarding the difference produced by various climatic influences; but it becomes really important when added to preceding cases and to many others I might produce, and that many of my professional brethren must also have observed. Why should the same symptom be insignificant in one climate, whereas, in another, this identical symptom is followed by other more or less serious accidents, and even a fatal end? The organism being the same, apparently at least, is it not rational to attribute these two different results to the difference of climate? Unless sceptical to a degree, it seems difficult that, after reading the facts I have mentioned, the salutary influence derived from our climate in pulmonary tuberculosis can be contested. I will only add, concerning the last case, that the different climatic influence in question was

clearly appreciated by the distinguished physician of the family, who insisted that they should spend three other winters at Pau, in view of consolidating the health of the eldest of the children, who had long, as I said before, given great cause of uneasiness.

To the reasons I have stated above may be added another, that cannot be overlooked, I mean the testimony of the patients, who declare, or prove, which is better still, that they have derived great advantages from a more or less protracted stay at Pau. It cannot be admitted that it would be easy to persuade unfortunate patients that they are really better, when they themselves feel feverish, sleepless, with a persisting cough, loss of appetite, and other painful troubles. Admitting even that they were induced to believe that their ailings were chimerical, very great, and almost impossible eloquence would be required to cheat them into an illusion, and to persuade them, month after month and year after year, that it is indispensable to leave their families, generally to the detriment of their pecuniary interests, and often interrupting the career they have chosen.

No, their preference for the climate they have adopted does not lie there; if they return, accepting all the sacrifices I have stated, it is because they find, in the progressive amelioration of their health, the most powerful of compensations. Some have even been obliged to establish themselves permanently in our town. I have known many who have only done so after having vainly tried, time after time, to return to their homes, where they have invariably failed to remain in health. It is of public notoriety moreover that a great number of the handsomest villas of Pau and its neighbourhood belong to strangers, obliged, by reasons of health, to establish themselves among us.

It must be admitted therefore that the testimony of the

invalid is no less important, in the appreciation of the advantages of a climate, than when he has to pronounce upon the efficacy of a treatment he may have undergone for other ailments. He, alone, in short, is able to pronounce definitively on any therapeutic effect, whether derived from a drug chosen in our materia medica, or from the combination, in the same region, of various climatic agents. Of what avail would be the excellence of a treatment of which the invalid remained unconscious? On the other hand, by what argument could you prove to him that the benefit he derives is only imaginary, that he does not know what he says, when he affirms that he can walk for hours without fatigue, whereas before, in spite of all his efforts, he could not have walked a hundred yards?

§ 2. — The conditions of the salutary influence of our climate are of two sorts : they are relative, on one hand, to the several variable elements that constitute the latter, and, on the other hand, to the power of resistance of the system, varying according to the more or less advanced stage of the disease, as well as to the invalid himself. Let us make a rapid examination of these conditions :

It would be a great fallacy to suppose that we can always pronounce upon the favourable or unfavourable effects of various atmospheric agents by the nature of the sensations we derive from them. Rainy weather is everywhere disagreeable ; and yet it may be prejudicial in one country, and favourable, or, at least, indifferent in another. In the beginning of my medical career, I have often prevented my patients from going out if the weather threatened rain, and yet, I have often remarked, and I know that several of my « confrères » have remarked also, that, generally speaking, grey and cloudy weather was much more suitable to our phthisical patients than a bright sun. Periods too long

of fine weather, those that extend to five or six weeks for example, are infinitely less suitable to their health than equal periods of cloudy and rainy weather. Fine winter days, I may even say, although speaking of my own country, the splendid winter days that we have at Pau, and that excite the admiration of strangers, are only favourable when intermingled with cloudy days, or when succeeding a rainy period. During such sunny periods, the mornings and evenings are generally cold ; but, from one to three, in the afternoon, we enjoy a warm spring temperature, from which invalids derive great benefit. Should these periods, however, extend, without interruption, beyond a month, the air becomes too dry, and the invalids do not continue to feel the same influence they had hitherto felt.

This is not the case with long periods of rainy weather, which undoubtedly prevent certain of our winter visitors from taking the daily exercise that is so salutary to them ; but the influence of these continual rainy days on pulmonary affections is far from being what one would *a priori* suppose. Far from bringing on a cough, the rainy weather seems to produce a salutary relaxation and a sedative effect, that astonishes many invalids. I cannot account for this particularity ; but exist it does, being daily confirmed by the observations of medical men, and by the experience of the patients themselves. I sometimes hear my patients say : « If I were at home, with this weather, I should feel so unwell as to take to my bed, or at least to my room ; » whereas the greater number of these invalids, particularly if they have not passed the congestive period, may be out in the air, with impunity, nearly in all weathers, without being seriously inconvenienced.

It does not follow that invalids should be allowed to commit imprudences, which they are too much inclined to do : I

am merely stating a fact, and this fact is too common-place to be denied by medical men or patients who have spent some time at Pau. In order to justifiy my assertions, I will give the two following examples : — I am attending professionally an invalid lady who, when at home, is easily affected by atmospheric variations ; and yet, for several years at Pau, she has attended the midnight mass, of course withont my knowledge or permission, but also without once feeling the slightest inconvenience. — Another of my patients,who declares that his native air, in winter, is downright poison to him,has been continually caught in the rain when returning from the long walks he daily takes in our climate. Without pretending to affirm, of course, that such imprudences are either useful or beneficial, and to be encouraged, I can only say that this patient never felt the evil consequences to which he repeatedly exposed himself. I have often heard him say : « If I were, at home, to take one quarter of the liberties I take with impunity at Pau, I should have been dead long ago ». This patient, however, showed all the signs of a tuberculous softening of the right apex, now almost completely checked. — I think it is not only useful, but even indispensable, to enter into these details, as the weight of an assertion depends solely on the precise facts that accompany it. We are bound to do so, moreover, when we feel a legitimate desire to persuade our professional brethren that we have sought rigorous and impartial observation, avoiding the suggestions of false patriotism, that would be injurious to the country we wish to benefit, if we were led astray in our appreciations by a culpable complaisance.

Among the conditions connected with the salutary benefits to be derived from the climate of our region, there is one that I cannot help mentioning, because it has struck

me so often. Travel having been everywhere so much facilitated by the establishment of railroads, here, like in other wintering stations, (for I know it is the same elsewhere) invalids generally come too late in the year. I should be afraid to mention the number of invalids I have seen arrive in November and December, severely affected in their lungs, after having experienced, in their own country, the effects of the first cold weather, always the more difficult to face in delicate organizations; whereas, if these invalids had come a month or two earlier, the great majority of them would have been much better able to obtain, if not a real amelioration, which is always slow, at least a staying of the dangerous progress of their disease. The months of September and October are generally very fine in Pau, and it is quite a pity not to take advantage of them; the interests of the invalids themselves are really at stake; for, were they to try and check, at an earlier stage, an affection that, by impeding nutrition, brings about a rapid and considerable loss of strength, two months care taken in time might spare them long years of exile.

In addition to the climatic conditions in themselves I have just mentioned, there are others, inherent to the patient, capable of greatly modifying the effects produced on the progress of tuberculosis. For example, it would be useless to state here, that, under the same circumstances, the power of resistance may, and does, vary in invalids whose pulmonary affections proceed from hereditary, accidental, or other causes.

But the principal difference of climatic action on various invalids depends upon the more or less advanced stage of the disease when they decide upon leaving home. Although I have observed, at all stages of the malady, surprising cures, or, in less favourable cases, at least an undeniable

and frequent prolongation of life, I must confess that the results obtained differ most materially, when the tuberculosis is of recent origin or goes back to some length of time; if the famous precept: *principiis obsta* can ever be successfully applied, it is surely in the treatment of pulmonary phthisis. This rule is still more imperative when the unfortunate patient is about to be submitted to the influence, invariably slow, however salutary it may be, of climatic agents. The fact cannot be denied that such cruel affections, in an advanced state, when one or both lungs are more or less extensively attacked in the apex by tuberculous softening, can rarely be cured in any country. No therapeutic agents, no climates exist, capable of reconstructing a half-destroyed lung; and, when it is possible to preserve the healthy portions of it, and thereby obtain the cicatrization of the diseased part, it is only by great care that such a result is obtained; neither can a definitive cure be expected but at the expense of several years spent in the south.

This is not the case, I am glad to say, when invalids decide upon leaving their homes at an earlier date. I am personally quite convinced, although I have not been able to make accurate statistics, that if they were to do so, more than three quarters of their number would obtain in a few years, if not one of those decided cures that defy morbid causes, at all events a very satisfactory state of health, providing they follow the elementary rules of hygiene. Every year, I note several of these fortunate cures, I might even add *unhoped for cures*, if we take into consideration the rapidity with which we often observe at Pau an amelioration in the premonitory congestions of pulmonary tuberculosis, which, on the contrary, in bad climates, defy the most vigilant and intelligent care.

It is absolutely impossible to argue that these pretended

cures should be attributed to errors in diagnosis, for no semeiological study has been more exhausted than that of incipient phthisis; no morbid affection, in its earliest stage, presents to the physician more decided characteristics. The greater number of our clients, moreover, come to us with a ready made diagnosis ; this diagnosis has generally been confirmed by the most prominent physicians, as families naturally regret the necessity of an indefinite dislocation of ties, prejudicial to their interests. The patients themselves, generally too careless as to the state of their health, do not willingly abandon their habits and their business ; they only accept on good authority the exile proposed to them ; and, not satisfied with the reasons given, the great importance of which they cannot realize, they always insist upon these reasons being confirmed by higher authorities, and seek the opinion of medical celebrities.

In confirmation of some of the preceding assertions, I can mention a case, recently observed, and likely to carry conviction, more than any other, to all it may concern ; for I can give it with very precise circumstances, submitted to the most enlightened control, my task being limited to the registration of facts, unable as I was to collect them all personally :

Case V. — The young patient in question, nine and a half years old, came to Pau on the 17 th of april 1880. Professor Jaccoud kindly addressed him to me, and merely wrote to me that the patient, in the month of February, being in Russia, was affected with a severe attack of hooping-cough, finally complicated by acute bronchitis, and probably by peri-bronchial adenitis. Without showing that « ensemble » of signs which usually denote immediate danger, the state of the child is far from being indifferent, and seems deserving of very serious care.

The face is pale and thin ; the features indicate pain ; a marked

loss of strength is evident ; and these symptoms, perhaps to a certain extent exaggerated by a long journey, persist however, without appreciable abatement, the two or three following days. With regard to the local state, auscultation and percussion only reveal the existence of intense congestion in the apex of the right lung, giving rise especially to very great obscurity of the vesicular murmur in all the sub-clavian region, as well as in the supra-spinata fossa, and in the upper third of the infra-spinata fossa.

But, to give additional weight to this case, I have carefully avoided all exclusively personal appreciations ; I appealed to the highest control I could find, and which, therefore, cannot be contested Unwilling to risk giving an incomplete idea of his views, I wrote to Professor Jaccoud to express a desire to publish the case of his little patient, and to advise him, at the same time, of the rapid improvement of the child. I begged him, therefore, to enlighten me more fully, if he should think fit, on this interesting case. I now give the valuable information he sent me, taken from his answer; it will show, much better than my personal appreciations could, the characters and nature of the affection the child was labouring under. I reproduce exactly all that concerns the fact iself, only suppressing passages in the letter that concern me personally :

« My dear confrère,

« Thanks to your good care and to his good constitution Mr X's « child has recovered more rapidly than I expected ; this result has « gratified me more than it has surprised me. In sending you the « young patient, I merely gave you a few diagnostic indications, « without explaining, from want of time, my opinion on this intense and highly febrile pulmonary congestion which tormented the « patient, irrespective of his fits of paroxysmal coughing. Without « doubt, I was not only justified in suspecting, but even bound to sus « pect the possibility of « granulosis; » and, in my opinion, the fact « of the child having been cured is no objection to such diagnosis ; « but another interpretation was possible, and I was more inclined « to adopt it, on account of analogous facts I had witnessed, I mean « an acute peribronchial adenitis, (I do not say a chronic adenopa-

« thy) producing, by compression, the vascular congestion in « question. Even now, I opine that this was the original « process, and we have had to deal with an acute adenitis, origi- « nating, as it sometimes does, in a severe attack of hooping-cough. « Therefore, if you are inclined to publish this case, and mention « my opinion, I should wish it to be expressed in the above sense, « which, now more than ever before, seems to me to be correct.

« I have already said that the fact of the cure alone does not ab- « solutely prevent the idea of incipient « granulosis ; » but in the « present case, however, there is one peculiarity that I can with « difficulty conciliate with such an hypothesis, I mean the rapidity « of the cure ».

« Believe me, etc,

« Jaccoud ».

The following is another account, concerning the same patient, written by his attending physician, Professor Rauchfuss (of St-Petersburg); it is dated April the 5 th 1880.

« X..., nine years and a half old, was taken with comparatively « moderate hooping-cough from the 26 th of February to the 22 d of « March; at the latter date, he began to get worse ; every day, there « was a moderate rising of the temperature ; the cough retained its « character.

« From the 26 th of March, the temperature assumed a regular « intermittent type, the temperatures of the night and morning « being normal, while those of the afternoon and the day were « higher, and sometimes even excessive. The perspiration was so- « metimes very abundant, especially at night. The spleen but slight- « ly swollen, and the bulk of the liver hardly increased. In the « lungs, signs existed of a catarrh of the large and middle-sized « bronchial tubes ; hardly any, except dry rhonchus ; sub-crepitant « rhonchus, blowing or tubal respiratory murmur, and other signs « of condensation of the pulmonary tissue are and have always been « entirely absent.— Latterly, in the right lung, the respiratory mur- « mur became more acute, as it does in cases of stenosis or of com-

« pression of the bronchi, while, in the inter-scapular region it lost « its vesicular character ; the expiration was loud and jerking ; « percussion gave a somewhat dull sound ; both here and in the « infra-spinata fossa the sound was also slightly dull.

« We have to take into consideration that the fever, which has « now lasted sixteen days, shows the type of resorption fever, — « such as it is often observed in patients who have some purulent « collection, or whose glands or other tissues are undergoing caseous « or tuberculous metamorphosis, and as we can find no other cause « to account for it than the morbid state consecutive to hooping « cough, I opine that we have to deal with a case of peri-bonchitis, « almost certainly connected either with hyperplasia or with dege- « neration of the tracheo-bronchial glands. One fact however re- « mains doubtful ; I mean whether this peri-bronchitis is or is not c tuberculous, whether this is a case of real tuberculosis, or only a « morbid state which might lead to it. Hoping that the latter opi- « nion, which is our last chance, may prove correct, I willingly « complied with the parents' wish, when they desired to give the « child the benefit of a mild climate and the salutary influence of « sun and pure air. I have selected Pau, because I hope that, in « June, the child will be able to change from Pau to some of the « higher summer stations of the Pyrenees, and especially Cauterets.»

Professor Rauchfuss adds to these notes a list of temperatures registered each day and at different hours. These temperatures were taken with minute attention by the mother of the little patient, who, gifted with the most intelligent solicitude, continued the registrations day after day during her stay at Pau. I have marked with the greatest accuracy on a chart the precise hours at which these temperatures were each day registered, enabling me thus to obtain the tracing engraved at the end of this work.

On this curve may be traced the different stages followed by this pulmonary affection, so threatening, perhaps even so dangerous, in its features ; for, admitting, as I am incli-

ned to do, that we had not to deal with an incipient genuine tuberculosis, but only with one of those severe congestions which so often precede its outbreak, the child's state was most serious. The mother told me that, when about to leave St-Petersburg, fears were entertained at every moment that the child would succumb. The curve shows also, with the most undeniable evidence, the gradual decreasing of the temperature, from the day of the patient's arrival at Pau, the 17th of April ; one week from the latter date, the 23rdof April, the temperatures had become normal, and remained so, although I have only entered them on the chart up to the 9th of May. Such a change may undoubtedly, to some extent, have been brought about by the repose that succeeded the excitement of a long voyage ; but this cause of calm, incontestable as it is, can only have played a secondary part in our young patient's case ; for, where could he have found more tranquillity than in his own country ? And yet, it was before he left, that the oscillations of the temperature were the strongest and the most dangerous. The stethoscopic phenomena showed the same rapid and progressive amelioration : each day, the air penetrated more and more freely into the congested lung, and the respiratory murmur, little by little, regained its normal sound.

But what cannot be seen on the chart was the joy of the poor mother, whose anxiety had been so great, as well as the cheerful aspect of my interesting young patient, who seemed to feel his own sudden recovery. As early as the day after his arrival, he was able to take daily carriage exercise, and from the 23rd, he was up for several hours each day, and able to walk about his room, whereas, before his departure for Pau, he never left his bed. From the 18th of May, he was able to ride every day, and continued from

that moment to enjoy all the attributes as well as the appearances of excellent health.

This case certainly did not much overburthen my imagination, and, yet, I have great doubts of being able to find another more replete with incontestable proofs in favour of our climate. To omit no essential detail, I should add that I merely prescribed to my young patient a dose of 20 centigrammes (about four grains) of bromide of potassium, morning and evening, for six consecutive days. I looked upon myself as bound to a certain extent to establish a treatment, recommended by Prof^r Jaccoud, and of which, from previous knowledge of this medicine, I augured favourably, although I had never employed it in similar cases. Admitting the auxiliary action of the remedy in the rapid and considerable amelioration noted, I cannot, however, attribute it solely to the effect of the therapeutical agent.

Allowing that a decided and gratifying improvement may have been remarked in a patient grievously affected, or, at any rate, seriously threatened, another delicate question remains to be solved, that is the length of his stay in the south. Ought we to look upon as definitively cured a patient who, after one or more winters spent in a favourable climate, shows all the outward signs of health, retaining but insignificant traces of anterior stethoscopic phenomena? As I said before, the solution of such a question is difficult, concurrently with all those that involve to a considerable degree the conscience of the physician. On the one hand, it is always a serious thing to run the risk of separating, without necessity, a father or mother from their children, or vice versa, or again to oblige an entire family to expatriate themselves, admitting even that such a prolonged exile does not cause them any material disadvantage ; on the other hand, it is no less serious to risk compromising in a

short time an uncertain and incompletely established cure, too often acquired by long sacrifices of all kinds.

Such a question, in many cases, cannot but place the most conscientious man in a difficult position ; it is therefore but rational, in such perplexing cases, that he should wish to submit his own opinion to that of some other enlightened and disinterested physician. Need I add that we must not lose sight of the fact that, if called upon to decide alone on the question, the interests of the invalids, like the climate that gives them relief, are essentially complex? The physician's duty is therefore to weigh these different elements with the strictest impartiality. It must not be inferred however that the best advice is always dictated by excessive reserve : I have often personally regretted not having been sufficiently affirmative as to the necessity of a prolongation of residence, a necessity I certainly thought most desirable.

In confirmation of the foregoing, I will cite the following example that made a deep impression upon me :

Case VI. — It refers to a very interesting young man, like many of those unhappily affected with phthisis, one of the survivors of a wealthy and numerous family, five brothers or sisters of whom had already succumbed to pulmonary consumption. Some years before, I had attended at Pau one sister, who died in a few months of acute, if not really galloping, consumption. This young man, with a charming disposition and a bright future (health permitting), had just completed his first year's studies in one of our important government Colleges, and came to Pau during the holydays to attend to his health and visit one of his relations.

On his arrival at Pau, at the end of August, I formally declared, though avoiding as much as possible to alarm him, that I could not allow him to return to the North for the coming winter. Although fully intending to comply with my decision, whatever it might be, he did not conceal that he could only accept it with the regret of

seeing all his dreams of future suddenly disappear with the ruin of his intellectual career. He presented the greater part of the characteristic signs that precede pulmonary tuberculosis ; the stethoscopic signs, happily, were but very slight in the apex of the right lung, showing in that spot a simple congestion, without the adjunction of any rhonchus.

Under the influence of rest, daily exercise in the open air, and delightful weather the young patient experienced so great and so rapid an improvement that I had not the courage to persist in my former advice. I merely detained him as long as I could, up to the middle of the following November, quieting my own conscience with the idea that I should expose him to the very danger I feared, if I inflicted upon him a very serious and lasting annoyance. He left, full of health and spirits, and this, to my great satisfaction, as I often heard of him, seemed likely to be permanent.

This great satisfaction, unhappily, did not last long. The following spring, my young friend felt the return of the old symptoms; but, in order to continue his studies, he neglected proper care. In the beginning of the winter, he came to Pau, quite decided this time to have no other care than the recovery of sound health. Alas! it was already too late ; signs of tubercular softening existed in the spot where simple congestion only had been detected the year before ; like his brothers and sisters, the unfortunate young man succumbed under acute phthisis.

Cases like the above leave behind them, in the mind of the physician, recollections and regrets that serve as lessons, clearly showing that excessive reserve has also its dangers, which should be taken into consideration, in the interest of the patient himself. I had already noticed several similar cases, where, with much less responsibility on my side, too short a stay had been followed by the same fatal result. I have thus imperceptibly been led, when I thought the case urgent, to affirm without hesitation to my patients that a longer residence in the south was necessary, taking the

precaution to add that the choice of a winter-station was at their option. It was precisely in this sense that I spoke to the interesting young patient whose fatal end I have just related, which proves that, from the onset, I had but too correctly appreciated the case. If I deviated later from the first wise advice I had given him, and in which I should have persisted, it was because I noticed that such a great improvement had taken place in so short a time. I thought he would have time to finish his studies and return, if necessary, the following year, his mind free from all preoccupations.

The knowledge that a new stay in the south is still necessary for certain patients, is inadequate; it would also be necessary — without fixing, on the onset, a limit to the time the invalid would have to remain, — limit that should not be told him prematurely, admitting the possibility of doing so at all, — to establish a practical rule for ourselves, correct enough not to allow of any deviation from reasonable, unexaggerated prudence in the advice we give. To establish an absolute rule in this respect is impossible : the climatic dose, if I can so speak, is like a medicinal dose : it varies according to the patient. Moreover, — and this is a practical conclusion of the highest interest, — generally speaking, *the residence in the south will be all the less prolonged, when the pulmonary affection to be attended to has been treated earlier, — in the course of the congestive period for example, — and vice versa.* I am quite convinced, for my own part, that one or two years attentive care would generally suffice, under these favourable circumstances, where double or treble the time would be required when the patient waits to attend to his healh until a manifest tuberculous outbreak takes place.

Considerable experience has taught me that it would be

imprudent to allow patients to winter at home too soon, for example the year following their recovery or quasi-recovery. Another year, in my opinion, is necessary to complete the cure, and this advice should be given to the patients or those interested in them. This limit, assuredly, may not be sufficient in all cases; the future will too truly show that, with some, it should be considerably increased. But in not fixing a limit, we run the risk of allowing our patients to lose, completely or partially, the benefit of their improvement; in trying to shorten the time, we expose ourselves to the chances of imposing upon them a renewed prolongation of care and attention. For this reason, I always advise those I allow to return home for the first time, to submit themselves to the most attentive medical « surveillance », and not to wait for all the symptoms of a relapse,before returning to the south. It is the only means of convincing them of the necessity of taking great care of themselves, and preventing them from paying too dearly for such a salutary knowledge.

§ 3. — Before seeking to ascertain from what particular causes a climate derives its curative or therapeutic properties in various morbid affections, there is another question to be solved, or to suppose solved; it is that which refers to the knowledge of the proper indications to follow in treating the morbid affection itself. It appears to me much more prudent, and certainly more easy, in the present phthisiological essay, to pre-suppose the problem solved, instead of trying to solve it. Such a supposition is not gratuitous, however; for the indications I am about to recall are registered in all works written on the subject.

What, then, are the indications to carry out in the treatment of pulmonary phthisis? Or, in other words, what should be prescribed to an unfortunate patient affected

or threatened with this cruel malady, to rid him of his ailings? Nobody will, I think, contradict me, when I say: *air*, *good food*, *and distractions*; all of which are, undoubtedly, suitable to other invalids, and even to those in sound health, but much more necessary to a consumptive person than to any other.

If instead of restricting himself tho the fulfilment of what is really his principal mission, that is to prescribe for his patient a useful, or reputed useful, medicine, the physician, who has always a right to be inquisitive, strove to discover why the drug itself is useful, or from what cause it is so, he could not fail to make a very natural inquiry, viz: how the different medicines usually given to phthisical patients are likely to act. If such an attentive examination led him to admit that all these medicines, when they are really useful, produce nothing else in fact than a greater facility of breathing and a more active nutrition, he might undoubtedly err, but such an error would certainly entail no fatal consequences.

But if, per chance, he is correct, he will understand that a consumptive patient, who suffers from anhelation in the commencement of his disease, because his lung is getting congested, undergoes a beginning of asphyxy. He will thus see that any agent capable of decongesting the lung, that is of reducing the fever, of increasing the impulse of the heart, and yet diminishing the number of its pulsations, he will see that this agent, be it arsenic, quinine, creasote, or even ergot of rye (*horresco referens*) will only be really beneficial if it admits of a more easy access of air into the lungs. He will then easily understand, provided he is correct in his appreciations, that the effects of a good climate have nothing mysterious in them, that the climate merely allows an unfortunate patient to inhale in a direct manner and

without interruption, from a chosen atmosphere, all the oxygen his organs incessantly require.

In this hypothesis, what is necessary to carry out our views? The air must not be too dry, as dryness in the air generally brings on coughing; neither must the atmosphere be too damp, for damp countries send us the greater number of sick people. It is therefore necessary that the air should present a sort of hygrometric average, possessing a certain mildness of temperature, with no disturbing currents, etc., etc., all of which conditions render the air particularly respirable to delicate and feeble persons. In short, the phthisical patient, with regard to air is a real epicure, and if he has not at his disposal an atmosphere that suits him exactly, he soon declines; he seems to refuse to exist in the same air as other people.

After the necessity not only of breathing a chosen atmosphere, but of breathing it as long as possible in the open air, the consumptive patient requires something no less important, I mean a restoring alimentation; besides, he must be careful in the regular performance of all acts connected with sound nutrition; and, as one of the essential conditions of sound nutrition is precisely the stimulation of appetite, what better stimulant can be found than exercise in the open air, frequently renewed, without fatigue? This new example was not necessary to establish the fact that, in the human body, all wants are linked together, and that the gratification of one is what conduces the most to the gratification of many others.

Something more is needed for the phthisical patient, or he who is threatened to become one, important in itself, although less imperatively so than the two former; it consists not only in not giving way to ennui, — a common place assertion, — but in taking *quiet* recreations, I mean

such as are *free from strong emotions,* and consequently the only distractions that suit his state of health. Study itself, the recreation « par excellence » of vigorous and well balanced natures, study may only be indulged in with great restrictions. All that requires serious and protracted attention of the mind, (and no studies, not even amusing studies, are exempt from it, at times) is detrimental in the extreme to these frail and delicate patients. No distraction therefore can be more salutary to the invalid than the contemplation of the beauties of nature ; a distraction he never tires of, and in which he forgets the sufferings and wretchedness that poor humanity is heir to. Can anything be more charming than the panorama of the Pyrenees on a beautiful sunny day, or the aspect of those delightful and varying landscapes, to be met with at every moment in our splendid country ? If it is true that man cannot generally do several things well at the same time, we must certainly except those disinherited by health, who freely inhale a soft and vivifying air, while they quietly exercise their failing strength, without fatigue, enjoying the warmth of the sun in the presence of the marvels of creation ; by this means, they unconsciously sharpen their more or less impaired appetite, which is the sole and indispensable stimulant to good digestion, as well as the necessary regulator of nutrition in health. Is it possible, I ask, in a few hours only, to accomplish more excellent things ? and may not the invalid who has achieved them exclaim, like Titus, at sunset, that the has not lost his time.

The above plain statement shows the difficulties to be encountered in attempting to arrive at a correct appreciation of what is really efficacious, to the exclusion of all else, in the various climatic conditions of a region. Does it depend on the altitude ? is the hygrometric state of the

atmosphere the most important factor ? or is it still something else ? all very difficult questions, on which the future may perhaps throw a light, but which it would be rash to try and explain at present. To establish with accuracy the real value of climates, as well as that of mineral waters, no more precise criterion can be found, at present, than that which is furnished us by well conducted clinical experience, I mean that collected by enlightened and conscientious men: Such experience is necessarily the only one likely to be durable, acquired as it is by careful and persevering observations, strengthened by proofs of all that is asserted.

If it is difficult to decide upon the absolute or relative efficacy of the various elements that contribute to the formation of a climate, carefully studied, how much more difficult must it be to arrive at an appreciation of climates unknown to us ? how then can we compare, unless it be by lengthened and difficult experience, the relative efficacy of various analogous climates in the same disease ? To establish such a useful comparison, what a number of slight differences should be taken into account, bearing not only on the analogous climatic influences in various neighbouring or distant regions, but also on those indiscernible varieties of symptoms to be seen in different people.

That such a comparison will become possible, after an undoubtedly considerable lapse of time, may assuredly be hoped for, as we may also hope for much greater progress in the whole field of human activity. But, to be fairly established, it can only be finally made by disinterested medical men, who examine and weigh with impartiality all the observations they may have collected from their « confrères », or from the invalids themselves. Not only have we the right, in the mean while, but it is the duty of all of us to establish a sort of pathological schedule, and even to

illustrate the advantages of particular winter-stations ; neither should we have any hesitation in doing so, if, after long and conscientious observations, we think we can support our opinion by convincing proofs. This task is useful enough in itself to exempt us from comparisons with other winter stations, with which we are insufficiently acquainted, as also to prevent us from throwing gratuitous discredit on some of them, which after all merely claim their own place under the sun. Would it not be better to allow the future, and the invalids themselves, the right of condemning unjustifiable ambitions ? Bad climates cannot feign long ; they would willingly pass for good, and be taken at their own valuation ; but they are called upon not only to establish their claims, but to furnish proof after proof, a difficult task for climates as well as for men.

Until the elements of a compared climatology can be collected and published by men of weight and authority, which can only take place at some distant period, foreign medical men, in directing their patients for the first time, will undoubtedly be guided, as in the past, by the most striking climatic differences that exist between their own region and various winter-stations. Such a comparison should be as complete as possible, I mean that it should bear not only on the various constitutive elements of climates, successively compared with those of the region inhabited by a given patient, but also on the prevalence of morbid affections existing in each of such climates. In other words, if the patient comes from a region where the atmosphere is dry and still, in which a certain number of diseases predominate, it would be preferable to send him to a winter-station where the atmosphere contains more moisture and less uniformity, and where the same diseases are rarely seen.

But when the invalid, more interested than anybody, has

been able personally to weigh the favourable or unfavourable effects of a climate, the physician who advises him will find, in such an unexceptionable testimony, a guide as sure as it is valuable in the future choice of a winter-station. For example, why should he advise a new region to a phthisical patient who has benefited by his stay, be it short or long, in a particular climate? The proof however, that we should not hesitate to recall the most elementary notions, is that I have seen a certain number of invalids, considerably benefited by a first or second winter in our climate, and naturally desirous of returning, dissuaded by their medical advisers.

I need hardly say here that I do not take my stand on the narrow-minded and exclusive interests connected with one particular wintering-station; I speak solely with regard to the interests of the patient himself, who only requires a change of treatment when the previous one has produced no alleviation. Would any one attempt to try a change of remedy with an epileptic patient, whose attacks had been attenuated, or retarded, by the administration of bromide of potassium? Failing a perfectly well assigned choice, the determining reasons of which cannot always be well defined, nothing can assuredly be more legitimate, in a first attempt to select one wintering-station sooner than another, than to be guided by the fact that it has been acknowledged, or even mentioned, as having exercised a happy influence on one or several invalids. But to expose an invalid, who affirms that he has benefited by a special winter-station, to the contingent effects of a change, without urgent reasons, is to abandon a certainty for an uncertainty, and even to assume, at times, what may become a heavy responsibility.

This cannot be the case when the invalid himself, instinctively or deliberately, be it even nothing but fancy, is the

first to ask for a change, on which he builds up new hopes. Why, in this instance, without some formal counter-indication, the serious reasons of which still escape our appreciation, why not consent to the invalid's wishes? A choice should be allowed between two or three favourable winter-stations, just as it would invariably be allowed between two or three drugs, very nearly equivalent, if one was more palatable than the others. I do not, of course, mean that the wish expressed by the patient should invariably and in all cases be acceded to, and that the true motives should not be carefully investigated, for they may be only pretexts, totally unconnected with health. But, if it is evident, and this is too often easily ascertained, that, taking into consideration the invalid's stay, the disease he brought with him has not been sensibly modified, why not allow such an invalid to hope a more speedy recovery from a change of climate? Is there not sometimes, in such a moral disposition, a first guarantee of success that the medical man should take into account, in the interest of his patient?

Such a method undoubtedly carries with it something arbitrary; but this arbitrary decision is regulated and undisguised, which is far preferable to a distinction, impossible to establish at present, regarding the curative properties of various analogous climates in different forms of the same morbid affections. This does not mean that no differences exist between these various climates, shades perhaps, that should be brought to light by persevering observations. But while admitting that it is quite justifiable to be guided on presumptions alone, when certainty cannot be attained, I firmly believe that such judgments should only be given or accepted with extreme reserve, on account of the difficulties that exist in establishing a classification of the various wintering-stations, on data that are, as yet, neither complete nor precise.

I ask for no other proof than the opinion, quite incomplete, if not erroneous, that is current on the mode of action, or rather on the characteristics of our climate.

In the very valuable and conscientious work written by Mr de Valcourt on the « *Climatologie des stations hivernales du midi de la France* » (1) we read that the climate of Pau is considered as *sedative*, and principally so on account of the stillness of its atmosphere, whereas the various wintering-stations of the littoral of the Mediterranean are looked upon as *tonic and more or less exciting*. Without doubt, our climate is really *sedative*, in this respect that the more or less intense fever that accompanies consumption in all its stages, that the initial fever of phthisis in particular, soon undergoes a marked diminution, and I, for my own part, have seen many striking examples of this. But this identical climate is *exciting* for certain persons in health, who show, at times, an exaggeration of general sensibility under the form of neuralgia, which should not, in my opinion, be considered of a rheumatic nature. Why is the climate *sedative* in the first instance, and *exciting* in the second? Because invalids affected or threatened with phthisis are only out at certain hours of the day, when the temperature is at its highest, whereas people in good health are out at all hours and in all weathers, exposed to all atmospheric variations, and thus undergo a certain excitation of general sensibility.

We thus see that the same climate, in different cases, may be simultaneously *sedative and exciting*; but nothing proves that the sedative nature of the climate in question proceeds from the stillness of the atmosphere rather than from any other atmospheric cause. This sedative nature can only be mentioned, and attributed, at present, to the combined cli-

(1) P. 181 et seq. Paris 1865.

matic elements, and not exclusively to one in particular.

I think I can point out, however, certain considerations which tend to prove that our climate possesses at least one particular kind of tonicity, one of its most remarkable effects being (I do not say that it is always very appreciable) that it produces, on diseased or sound organism, a diminution of the number of the pulsations of the heart. This effect really exists, although very apparent only in certain patients; it has been pointed out by sir Alexander Taylor, and Mr de Valcourt himself:

The former of these physicians says: (1) « We have found « *that the climate exercises also a similar influence on the pulse* « *of strangers, after the lapse of time. The pulse, in healthy* « *persons is permanently reduced several beats*; and in pro- « portion also among the sick as the symptoms become « ameliorated, so is it attended by a permanent diminution « in quantity and an improvement in the quality of the pul- « se. » — « With regard to foreigners coming from more « severe climates, says Mr de Valcourt, their temperament « soon gets modified, their nervous irritability decreases; « *their pulse slackens by several pulsations and in a permanent* « *manner*. »

This action is sometimes most rapid, as it were, instantaneous. I know the son of a renowned provincial physician, a very observing man, who often visited Pau, although in good health; he affirmed that the day after his arrival, he ascertained that *a diminution of eight, and sometimes twelve pulsations* had taken place, and the contrary effect was immediately produced when he returned home, to Touraine.

What then does this decrease in the arterial pulsations prove? According to the law so well established by Mr Ma-

(1) Loc. cit. p. 98.

rey, it proves that the arterial tension has increased, and that the heart, in consequence, although beating less frequently, must display more strength to overcome the resistance it has to struggle against. « *The frequency of the pulse*, according to the learned physiologist, *is in inverse ratio to the « arterial tension »* (1). Then, whether this increased tension be attributed to a greater initial energy of the heart itself or of the smaller arteries, it is not less true that it is always derived from a greater energy of the muscular fibres of either one or the other of these circulatory organs, or probably of both. Might we not find in this the type of what is called, and may yet be called *tonicity* ? Where, when and how could this general physiological property, of wich so great an abuse has been made in applying it indistinctly to all the tissues, appear more evident? When can it really exist, and what characteristics will demonstrate it, if, when the heart and the vessels have acquired more contractile power and when nutrition has become more active in all the organs, it is called in question ? Is it not well established that a consumptive patient soon gets stouter and stronger when the circulation becomes nearly normal, or, in other words, when the fever has undergone a sufficient abatement? How have they managed besides, to discern in other regions, and not in ours, a climatic influence perhaps too vaguely described under the name of *tonic action*, or *tonicity* ?

This plain observation, interpreted according to conclusions furnished by experimental physiology, reveals therefore to us an incontestable kind of *tonicity* that appertains to our climate, and if we have sought to weigh upon this fact, it is not for the vain satisfaction of adding another qua-

(1) Physiolog. médicale de la circulation du sang. p. 209. Paris 1853.

lity to all those allowed to our winter-station, nor to deny it to those which, like our own, possess it. We will add, moreover, that we do not pretend to give to the above appreciation a degree of accuracy it does not admit of, or that a mere cursory view, however probable it may be, does not sufficiently establish. We merely wish to demonstrate that it is impossible, at present, to describe by one word the characteristics of a climate, and that the influences exercised by it can only be truly revealed by long clinical observation ; the mere knowledge of the various climatic conditions of a country can teach us nothing positive in this respect.

This *tonicity*, appertaining to our climate, has been pointed out by a distinguished Hanoverian physician, who spent several winters at Pau, and recorded in an excellent pamphlet various medical observations made during his stay in our town : « Pau, says Mr Fr. Schaer (1), by the distinctive qua- « lities of its climate, belongs, as I have already stated, to « the class of climates that calm the organism, producing « on it a sedative action. But, as increased strength may « be acquired at Pau, I also think that, owing to its particu- « lar situation, as also to certain elements communicated to « its atmosphere, this town possesses, at the same time, « inherent qualities capable of contributing to strengthen « and cure affected organs ; I therefore should look upon « Pau as capable of both *calming and fortifying* the system. »

This example shows us that, if we must ever and every where be on our guard against hasty judgments, a similar prudence is still more necessary in general climatological studies, where the complete elements of an exact and minute comparison are still too often wanting. For errors such as

(1) Essai climatologique sur Pau, p. 9. Traduit de l'Allemand, Pau 1863. Lafon Ed.

I have just described might undoubtedly escape the notice of the most enlightened and most conscientious observers, if too hasty in judging definitively other climates ; such judgments, to carry with them proper maturity, would require time, as well as the cooperation of a great many enlightened and impartial men.

Such are the principal reflections suggested to me by the study of the influence our climate possesses on the progress of pulmonary consumption. However incomplete they may be, I trust they will not prove quite useless, in this respect at least, that they will call the attention of medical men to a great number of missing links revealed to us by an attentive examination of this important and difficult question.

III. — I must now speak of the AFFECTIONS OF THE CIRCULATORY ORGANS ; but on these, I have only a few words to say. With regard to the *heart*, I must mention the rarity of *endo-pericarditis*, a fact which is itself in connection with the rarity of *rheumatism* in our region. We have, however, to reconcile this assertion, which I believe to be entirely correct, with an exactly adverse opinion, prevalent among the inhabitants, viz : that rheumatism, on the contrary, is very frequent. The latter opinion may be accounted for by the fact that the name of rheumatism is generally given to neuralgic pains, which are often observed in healthy persons, under the influence of sudden and considerable atmospheric variations. Were we to describe as rheumatism every one of the affections that are generally called *a frigore*, such neuralgic pains would be rightly denominated *rheumatic* ; but it seems to us that the latter qualification should be exclusively applied to the very peculiar kind of inflammation, which, under the influence of damp cold, invades the articular, and even some of the larger,

serous membranes. Professor Jaccoud carefully draws the same distinction, when he writes (1) : « I am quite aware « that several authors, the learned Eisenmann among « them, take a different view; they call *rheumatic* any morbid « phenomenon that appears under the influence of cold ; « so that, to keep within our subject, the names of *a frigore* « paraplegia and rheumatic paraplegia would be perfectly « synonymous. As far as I am concerned, I cannot accept « such an interpretation.....

«

« It is an injudicious use of the words, not to say a medical « mistake. If a paraplegia appears in the course, or at the « end, of an attack of rheumatism,— should it even precede « the habitual symptoms of this disease, as endocarditis « sometimes does ; — if it is developed in a person who « does not, at that moment, show the characteristic features « of rheumatism, but, on account of either personal or « hereditary tendencies, may be called a rheumatic person, « I will willingly call this paraplegia a rheumatic paraple- « gia ; but I really cannot make up my mind to go any fur- « ther ; for, in good faith, there can be no rheumatic phe- « nomenon where there is no rheumatism ».

The word being thus understood, acute rheumatism, in short, true classical rheumatism, is very scarce in our region ; and two years have sometimes elapsed without my observing a single case.

This peculiarity will be easily accounted for, if the reader will only remember what I have already mentioned regarding the slight amount of moisture with which the atmosphere is impregnated in our region ; for everybody knows that acute rheumatism is chiefly developed under the influence of cold damp.

(1) Les paraplégies et l'ataxie du mouvement, p. 340. Paris 1864.

IV. — I have finally to speak of the various kinds of fever observed by me in our region.

1° After the long and laborious investigations I have made on intermittent fevers, and on the other forms that marsh poisoning may assume, the results of which I have already published in prior works, I think it is unnecessary for me to reproduce assertions already mentioned, the correctness of which has been confirmed by my ulterior experience. I will merely state that during the last twelve years, that is from the date when my work on « *Impaludisme* » was published, fever seems to me to be considerably less frequent, and severe cases to have become day after day more and more scarce.

This change is, in a great measure, due to the fact that a considerable part of the waste lands (« *Landes* ») in the neighbourhood of the town have been cultivated ; but it is equally due to the fact that quinine, no longer feared, is even favourably accepted by the patients, and administered with confidence, or at least without parcimony, by most medical men, who have, at last, unanimously agreed on this important question. It required the spontaneous and resolute concurrence of many authorized « confrères » to attain this end ; for, without them, the utopia, or the mere theory of the eve would never have become the common practice of the morrow. This example proves once more that incessant struggle overcomes the strongest prejudices, and that the ridicule, too often thrown upon progress obtained after long efforts, can never be reflected upon those unjustly criticised. It proves moreover that a *useful* therapeutic agent, acknowledged as such after conscientious studies and by enlightened medical men, *whether this agent be called quinine or by any other name*, can defy the malignancy of men, and will ever remain *useful*, whatever opinion may have been conceived of it *a priori*.

Without insisting further on this subject, I think it right to give a general indication, that has proved very useful in practice, revealed to me as it has been by long observation. Having remarked how *cases requiring quinine* (I do not mean simple intermittent fevers) were frequent in all our region, I arrived, little by little, to this conviction, that, *in giving quinine indistinctly to all our patients, we should only be mistaken twice out of ten times*, and vice versa. Without pretending, of course, that this general view should, in the least measure, prevent medical men from establishing their diagnosis *with the greatest care* in each case, I say and I know from experience that it may at least be of great use in doubtful ones.

Guided by this plain experimental fact, I have often prescribed quinine successfully to patients at a distance, with the sole knowledge that their ailings had given rise to various diagnostic interprétations, and had defied what appeared to be the most rational treatment. By this simple means, — and I do not hesitate to divulge the secret, — I have been able, without visiting the patients, to cure a great many, when clever and conscientious medical men, who attended them with care, had exhausted, without any appreciable result, the most varied therapeutic resources.

It would be a great mistake to suppose that, in expressing myself thus, I am giving way to the suggestions of useless vanity, or trying to enhance my own merits at the expense of experienced « confrères », whose character and learning none can honour more than I do ; for, what I am about to relate happened to myself some years ago, at a time when I was physician to the Southern Railway, at Pau :

Case. — I was called upon to attend the wife of a working man on the line, who was very ill ; and although I had learnt from experience that the greater number of the sick people disseminated within my limits were attacked with evident or larvaceous paludal fevers, I could not, in a case, if not dangerous, at all events obscure and menacing like that mentioned to me, prescribe from a distance. I therefore visited the patient, and found a well marked paresis of the lower limbs, which had occurred without fever, some days before, preceded by neither chill, traumatism, nor any other apparent cause. Judging from these symptoms and others I think useless to enumerate in detail here, that I had to deal with an incipient medullary affection, without being able however to determine its origin or its nature, I made a serious prognosis, and began a local revulsive treatment, with an internal medication consisting of iodide of potassium.

Some days later, they came to me again, and told me that the patient seemed to have got much worse, which did not astonish me, and I was requested to call again. Unable to go, on account of a distant visit, the idea suggested itself to me to carry out, in this case, the general principle I have just spoken of, and which had succeeded so often : I therefore prescribed quinine, until, if no change took place, I could again see the patient. But, after four days treatment by quinine, at 0.75 centigrammes only each day, I learnt that she had already partially recovered the use of the lower limbs, while her general state of health had considerably improved. The complete cure was brought about in less than fifteen days by the continued administration of very moderate doses of the same medicine.

Here, then, is a patient I had examined with the greatest care, without finding any indication for administering quinine, and cured later by adopting a sort of exploring treatment, which had allowed me to detect the nature of the disease in numerous ill characterized paludal affections, I mean those devoid of fever and intermittence. This example shows the practical importance that should be given to the

plain general indication I have mentioned above, and how useful it is to carefully ascertain the prevalent diseases of a district, in order to avoid, in many cases, remissness and indecision, which may seriously affect the welfare of the patient.

2° I have but little to say here on TYPHOID FEVER, having, in another work, carefully studied its pathological physiology and its treatment. Although, on this pyrexia, I may not be able to give searching and complete statistics, it has appeared to me to affect more frequently and with greater severity young girls, from fifteen to twenty, than boys and young men of the same age. If this particularity is correct, what should it be attributed to? and is it also observed in other countries? are questions I cannot possibly answer with any degree of precision. — I can only affirm that if, in this affection, a danger of contagion exists, this danger must be very slight in our region ; for I can find no facts establishing such a contagiousness in an undoubted manner.

There is moreover one remark I must point out, because it has struck me very often, and which fully proves the almost total absence of contagion ; it relates to the fact that typhoid fever never appears simultaneously, or at short intervals, among the inhabitants of the town and the soldiers admitted to the wards of the civil hospital. I can at least say that I have not observed this coincidence once in a period of twelve years Practically, however, we should act as if contagion did really exist, and I have never dispensed for my part with taking, in each case, all precautionary measures to prevent the propagation of the disease.

The cases of typhoid fever developed in the town, as a rule, are not frequent; only once in twenty years have I seen them numerous enough to constitute a slight epidemic, and that was in the spring of 1874. These seem to me to

have become very rare, since the day they began to establish the system of sewers that run through all our streets, and which are now very nearly completed. I have accordingly seen but *two cases in nearly three years.*

As soon as this canalisation has been completed, and provided that care be taken to apply strict regulations, as I know they are determined to do, so that, wherever the water comes from, it be really and abundantly lavished everywhere from the pipes of the privys and water-closets to the principal and secondary sewers, such an enterprise will honour the entire municipal administration, and particularly Mr Lacoste, « *adjoint* » to the Mayor, who was the first to promote the idea, by demonstrating its advantages in a remarkable report presented to the departmental Board of Health. Our town will be one of the first throughout France to apply this *complete* system of sewers, which has already received the sanction of experience in Belgium and in England, to the great advantage of hygiene and salubrity in the large towns. These sewers are accordingly intended not only to convey away the rain water and the foul dirt of the streets, but also to carry off, by a flush of water, to the neighbouring streams, all fæcal matter, before fermentation begins ; and later on, the use of such matter for agricultural purposes may be acquired. The practical realization of such a problem in all important centres, while developing general prosperity, would tend to advance hygienic interests of the greatest importance.

Taking into consideration the natural facility of drainage Pau must afford by the marked slopes from the « plateau » of the town to the ravine of the Hedas, serving as main sewer, we may rightly affirm that the rapid and free circulation of matter will everywhere be attained by a frequent and regular flush of water. For, even at present, in the sections

where the sewers exist, — and this has been ascertained, — the rain-water alone suffices to thoroughly cleanse the channels it flows through. We can therefore predict, without fear of being mistaken, that, before long, two years at the latest, typhoid fever will no longer find cause to break out among us : for it is well known, by what has been observed in many large towns of England, that typhoid fever invariably disappears, where a good system of sewage prevents the stagnation or infiltration of fæcal matter in the soil.

There is another peculiarity worthy of interest, that I think it right to mention, and that I have not been the first to point out ; for nearly all the army surgeons who have been at Pau, have made the same remark before me. It consists in the fact that the overcrowding of young soldiers at our barracks, fortunately under rare circumstances, may develop among them typhoid fever of more or less intensity ; even in this case, we may see that, in spite of all, the danger of contagion is almost null ; for I have never observed simultaneously the same fevers among the inhabitants and the soldiers. This fact, brought with persistance before the military authorities, would certainly suffice to prevent for ever even a distant return of typhoid or typhical affections among the soldiers of the garrison. One is at a loss to understand what could have suggested the idea of adding another story to our barracks, when there was already one too many. Undoubtedly, those who suggested and realized it were little guided by the requirements of hygiene. But, at the present day that we appreciate more than ever, principally in military questions, the timely aid of this salutary science, we may hope that, sooner or later, a part of the building may be appropriated to storage rooms, or some other useful purpose, without, on this account, diverting it from its original destination within proper limits ; for bar-

racks are only intended to lodge soldiers, but not to overcrowd them.

3° With regard to ERUPTIVE FEVERS (1), they generally assume in our region the most remarkable mildness, although I have seen imprudences of all sorts committed by patients. Thus, in twenty years practice, I have only witnessed *two deaths* from MEASLES. The first case, a child eighteen months old, was carried off by convulsions, which occurred when the eruption made its appearance. The second, I had to attend an adult, about thirty, with whom everything was going on favourably, when he committed the imprudence of leaving his bed, the eruption having fully broken out ; he died almost suddenly the same day from a double congestion of the lungs and brain.

I have observed three epidemics of SCARLET FEVER in twenty years, and during these three epidemics which gave rise to numerous cases, I only had to deplore the *loss of three patients*, two of whom died of cerebral accidents, and the third of that form of secondary croup various authors, Graves (2) among others, have pointed out in the course of scarlet fever In spite of this mild character, in such an insidious eruptive fever, I invariably take the greatest care both to avoid contagion and to preserve the patients from possible danger. But I have noticed many patients who neglected the slightest care, exposing themselves too soon to the air, and committing several other imprudences, without the advent of any serious complication.

(1) I except small-pox, which appears to me to possess the same average gravity and the same irregularity in its course here as it assumes elsewhere. I have seen very few cases, however, because I have always been careful to adopt preventive vaccination among my patients when the apparition of even the slightest case of small-pox in our region came to my knowledge.

(2) Leçons de Clinique Médicale. T. I. p. 414 Traduction de Jaccoud. Paris 1862.

On the other hand, I have constantly remarked the same attenuation, if I can use the word, in the apparent characteristics of the eruption of pustulæ after VACCINATION. For instance, in most cases, the fever that accompanies the breaking out or the maturation of the pustulæ, is nearly absent or very slight. Again, the inflammatory areola, which accompanies the latter, rarely exists when human vaccine-lymph is employed. Some time ago, I made comparative experiments with cow-pox, taken from heifers that I had inoculated myself, and even when using this lymph on children who had never been inoculated, the inflammatory areola was very slight, and even wanting very often around the pustulæ. Lastly, I have never witnessed a single case of phlegmon or abscess after the numerous vaccine inoculations I have made. In spite of the attenuation I have pointed out in the consecutive inflammatory phenomena of this slight operation, I never remarked that the power of the virus and the duration of its effects were less here than elsewhere.

I will only allude slightly to VARICELLA, of which I have seen a great number of cases in children ; varicella is however as mild elsewhere as it is in our region. But I have frequently noticed, with regard to this eruptive fever, the same misinterpretation, that Trousseau (1) alludes to with so much insistance, which consists in confounding varicella with varioloid. No well informed physician, in our days, is unaware that, in these two eruptive fevers, there is a difference of nature, and that one can never be transformed into the other. Although both contagious, and requiring therefore that certain precautionary measures be taken, it may not be useless to state that varicella, in being commu-

(1) Clin. méd. de l'Hôtel-Dieu de Paris. T. I. p 130. Paris 1861.

nicated, can never produce the development of small-pox ; for this simple knowledge will suffice to clear away alarm among the uninitiated, who might be, and are often, led into error by an apparent similitude of symptoms.

4° *Infectious fevers.* — The same mildness I have pointed out in eruptive fevers in our region is observable also in ERYSIPELAS : in the whole course of my practice, I have seen a great many cases, particularly in the face, and not once has the disease proved fatal. Twice, with an interval of fourteen years, the same patient showed the same symptoms of meningitis, proceeding from a facial erysipelas, and twice a complete cure was obtained, although at each time the symptoms noticed were very alarming. In another instance, erysipelas set in after an amputation of the arm, in a very weak patient, and spread successively all over the body; even in this case, death did not ensue. Lastly, I have not seen a single case proving to me that it is contagious in our region. This new example shows us, therefore, how the prognosis of the same disease should vary according to the countries in which it is observed. All medical men have often been painfully impressed in seeing, in our large hospitals, certain forms of erysipelas, communicated by the patients to their attendants, assume with both the same overwhelming gravity.

No such result has ever been witnessed here, where PURULENT INFECTION, after operations, is equally unknown. In the first years of my practice, I performed a great number of serious operations, and attended many traumatic cases, without once observing this serious complication in wounds ; neither should we ever have invented at Pau those anti-miasmatic dressings, undoubtedly very useful in many places, and principally in great and populous centres, but which would justly pass for useless superfluity in our

region. On account of this special kind of salubrity, it would be interesting, for those who have undertaken this difficult study, to make a comparative examination of the « *microbes* » of the air in the respective countries.

I must also point out the excessive scarcity of diffuse inflammation, which undoubtedly requires a favourable medium for its development ; for I have never seen a single case during my practice at Pau. I have certainly witnessed, at long intervals, some cases of phlegmonous inflammation of the limbs, or other dangerous regions, such as the neck for example ; but I have always been astonished at the slow progress with which these phlegmonous inflammations spread in the aponeurotic sheaths in which they originated, as well as the great tendency they had to limit themselves and to spare the neighbouring sheaths.

Neither have I observed, during my twenty years practice, a single case of PUERPERAL FEVER, be it in the town or at the Lying-in Hospital, which has been under my direction for fifteen years. Medical men are well aware that all these infectious fevers, *purulent infection*, *malignant erysipelas*, and *puerperal fevers* generally go together, and are simultaneously seen in the hospitals of large towns ; it is not therefore extraordinary that they should all be found wanting in the same region.

Such are the general observations I have been able to collect, — observations I have thought worthy of being pointed out, — regarding the differences our climate may impress on various morbid affections. I submit them in full confidence to the appreciation and control of my native and foreign « confrères, » not that I pretend to infallibility in this essay, but because I have made them conscientiously and after mature reflections, hoping thus to have acquired the right of claiming that both should take an indulgent view of my work.

CONCLUSIONS.

1° Among the principal infectious diseases, such as diphtheritis, erysipelas, purulent infection, etc., etc., some are very rarely seen in our region, and others do not even exist;

2° When they do exist, they never assume the malignant character they sometimes acquire in other parts, particularly in damp climates;

3° They generally present a very slight degree of contagiousness;

4° The greater number of eruptive fevers are remarkably mild;

5° The morbid affections that are most prevalent in our region are derived from « impaludism », and they tend to decrease and to take a milder form every day;

6° Those produced by cold damp, such as rheumatism, pulmonary phthisis, etc, are rarely seen;

7° To the latter climatic property the town of Pau owes its reputation as a winter-station;

8° The beneficial effect of our climate on the progress of pulmonary phthisis is brought into light principally by the scarcity of consumption among the natives, as well as by the improvement which a more or less protracted residence in our region invariably brings about in certain invalids, not yet seriously attacked, after several successive recrudescences contracted in other countries;

9° This happy influence, that generally appears at all stages of the disease, excepting in very serious cases, only becomes evident in the outbreak, at the congestive period;

10° It should not, at present, be attributed to any special element of the climate, but seems to depend on the combined qualities of an atmosphere rendered more respirable, and contributing thereby to the oxygenation of the blood;

11° A well directed clinical experience will better determine than anything else the real value of a climate;

12° It is therefore according to the effects produced on patients that, in different cases, a prolongation of stay in the same wintering station, or a change of climate, should be advised;

13° In the choice of a wintering station for the first time, we should be guided by a comparison of the various climatic elements of the patient's own region with those of a wintering station that differs the most from it;

14° The data of medical climatology are, as yet, too incom-

plete and insufficiently precise to allow, or to justify, any attempt at a useful classification of various winter-stations ;

15° The climate of Pau, reputed as exclusively *sedative*, is also *tonic* ; and such errors in appreciation may have been, or might be made with regard to other climates bearing a certain analogy one with the other.

TABLE OF EQUIVALENTS

OF THE CELSIAN (CENTIGRADE) AND FAHRENHEIT THERMOMETERS

As all the temperatures recorded in this book are registered according to the Celsian (centigrade) scale, the translator thinks the following table may be of some service to English readers; it is taken partly from the French « Annuaire du Bureau des Longitudes » and partly from E. Seguin's work on « Medical Thermometry and human temperature ».

Fahr.	Centig.	Fahr.	Centig.	Fahr.	Centig.	Fahr.	Centig.
14	—10.00	32	— 0.00	50	10.00	68	20.00
15	— 9.44	33	0.56	51	10.56	69	20.56
16	— 8.89	34	1.11	52	11.11	70	21.11
17	— 8.33	35	1.67	53	11.67	71	21.67
18	— 7.78	36	2.22	54	12.22	72	22.22
19	— 7.22	37	2.78	55	12.78	73	22.78
20	— 6.67	38	3.33	56	13.33	74	23.33
21	— 6.11	39	3.89	57	13.89	75	23.89
22	— 5.56	40	4.44	58	14.44	76	24.44
23	— 5.00	41	5.00	59	15.00	77	25.00
24	— 4.44	42	5.56	60	15.56	78	25.56
25	— 3.89	43	6.11	61	16.11	79	26.11
26	— 3.33	44	6.67	62	16.67	80	26.67
27	— 2.78	45	7.22	63	17.22	81	27.22
28	— 2.22	46	7.78	64	17.78	82	27.78
29	— 1.67	47	8.33	65	18.33	83	28.33
30	— 1.11	48	8.89	66	18.89	84	28.89
31	— 0.56	49	9.44	67	19.44	85	29.44

Fahr.	Centig.	Fahr.	Centig.	Fahr.	Centig.	Fahr.	Centig
86	30.00	99.14	37.3	102.875	39.35	106.34	41.3
87	30.56	99.32	37.4	102.92	39.4	106.52	41.4
88	31.11	99.50	37.5	103.10	39.5	106.70	41.5
89	31.67	99.68	37.6	103.28	39.6	106.88	41.6
90	32.22	99.86	37.7	103.46	39.7	106.925	41.625
91	32.78	99.95	37.75	103.55	39.75	107.06	41.7
92	33.33	100.4	37.8	103.64	39.8	107.15	41.75
93	33.89	100.22	37.9	103.82	39.9	107.24	41.8
94	34.44	100.40	38	104	40	107.375	41.825
95	35.00	100.58	38.1	104.18	40.1	107.42	41.9
96	35.56	100.67	38.15	104.36	40.2	107.60	42
97	36.11	100.76	38.2	104.45	40.25	107.78	42.1
97.16	36.2	100.85	38.25	104.54	40.3	107.825	42.125
97·25	36.25	100.94	38.3	104.72	40.4	107.96	42.2
97.34	36.3	101.12	38.4	104.90	40.5	108.05	42.25
97.52	36.4	101.30	38.5	105.108	40.6	108.14	42.3
97.70	36.5	101.48	38.6	105.125	40.625	108 185	42.375
97.88	36.6	101.66	38.7	105.26	40.7	108.32	42.4
98.06	36.7	101.75	38.75	105.37	40.75	108.50	42.5
98.15	36.75	101.84	38.8	105.44	40.8	108 68	42.6
98.24	36.8	102.2	38.9	105.62	40.9	108.725	42.625
98.42	36.9	102.20	39	105.80	41	108.86	42.7
98.60	37	102.38	39.1	105 98	41.1	108.95	42.75
98.78	37.1	102.56	39.2	106.025	41.125	109.04	42.8
98.96	37.2	102.65	39.25	106.16	41.2	109.175	42.875
99·05	37.25	102.74	39.3	106.25	41.25	109.22	42.9
						109.40	43

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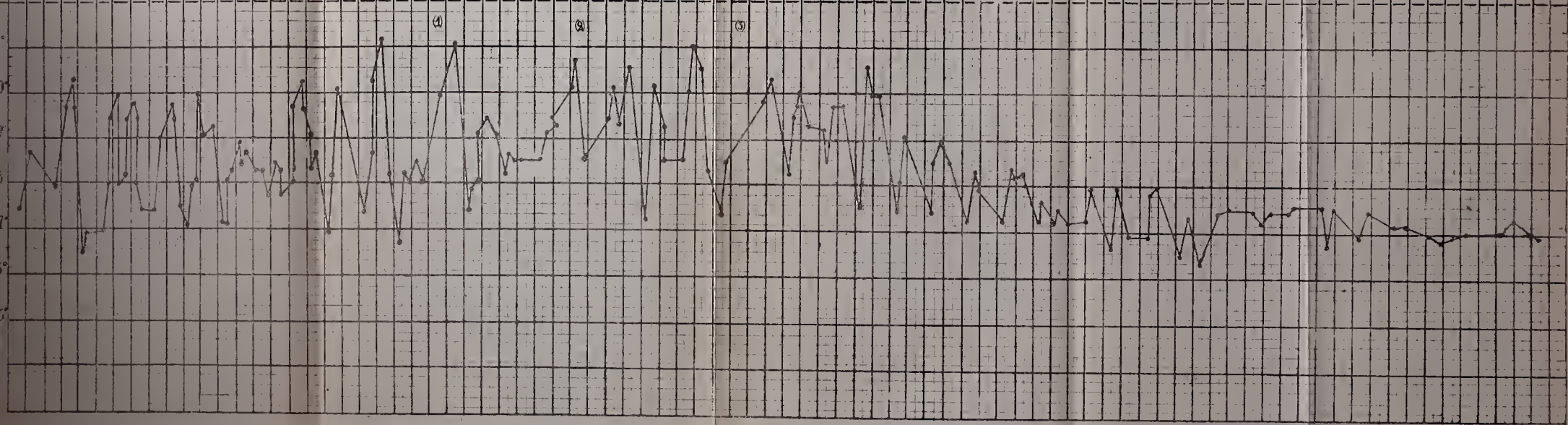
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CASE V.



NB *There are two columns for each day The temperatures registered during the day (from 6 o.cl AM tho 6 o.cl PM are recorded in the first column (d) - The temperatures registered during the night (from 6 o.cl PM to 6 o.cl AM) are recorded in the second Column (n.)*

(1) Day on which the patient left St Petersbourg for Berlin

(2) " " " " Berlin for Paris

(3) " " " " Paris for Pau

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